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I. ANALYSES OF FERTILIZERS—FALL SEASON, 1910.

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II. REGISTRATION OF FERTILIZERS.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, N. C., January 15, 1911.

SIR:—I submit herewith analyses of fertilizers made in the laboratory of samples collected during the past fall. These analyses show fertilizers to be about as heretofore, and to be, generally, what was claimed for them. I recommend that it be issued as the January BULLETIN.

Very respectfully,

B. W. KILGORE,

State Chemist.

To HON. WILLIAM A. GRAHAM,

Commissioner of Agriculture.

I. ANALYSES OF FERTILIZERS—FALL SEASON, 1910.

By B. W. KILGORE,

W. G. HAYWOOD, J. M. PICKEL, J. Q. JACKSON AND W. H. STROWD.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the fall months of 1910. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural state, the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them.

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They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate (as the costs of fertilizing materials are liable to change, as other commercial products are), but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and

potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1910.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano	31½	cents per pound.
For nitrogen	18	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid.....	41½	cents per pound.
For nitrogen	191½	cents per pound.
For potash	51½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percentage or Lbs. in 100 Lbs.</i>	<i>Value Per 100 Lbs.</i>	<i>Value Per Ton, 2,000 Lbs.</i>
8 pounds available phosphoric acid at 4½ cents...	0.36 × 20 =	\$ 7.20
2 pounds potash at 5½ cents.....	0.11 × 20 =	2.20
1.65 pounds nitrogen at 19½ cents.....	0.321 × 20 =	6.42
Total value.....	0.791 × 20 =	\$15.82

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance.....	\$ 3.20	\$ 3.20	\$ 3.40	\$ 3.20
Apex.....	2.70		3.80	3.00
Ashboro.....	3.20	3.20	3.60	3.20
Asheville.....	4.00	4.00	4.00	4.00
Chapel Hill.....	2.95	3.20	3.90	3.20
Charlotte.....	2.65	3.20	2.85	3.20
Clayton.....	2.48	2.86	3.63	2.80
Cherryville.....	3.85	3.60	3.40	3.63
Clinton.....	1.60	3.00	3.20	3.00
Creedmoor.....	3.00	3.00	3.80	3.00
Cunningham.....	3.00	2.40	4.00	2.40
Dallas.....	3.00	3.60	3.40	3.60
Davidson College.....	3.00	3.20	3.20	3.20
Dudley.....	1.70	3.00	3.20	3.00
Dunn.....	2.00	2.80	3.20	2.80
Durham.....	2.80	2.83	3.20	2.83
Elkin.....	3.60	3.20	3.60	3.20
Elm City.....	2.10	2.60	3.20	2.60
Fair Bluff.....	1.60	3.80	2.40	3.80
Fayetteville.....	1.80	3.00	3.00	3.00
Forestville.....	2.85	3.00	3.80	3.06
Gastonia.....	3.12	3.25	3.12	3.25
Gibson.....	2.10	3.50	2.10	3.50
Goldsboro.....	1.80	2.80	3.20	2.80
Greensboro.....	2.96	3.00	3.40	3.00
Hamlet.....	2.00	3.00	3.60	3.00
Henderson.....	3.00	2.83	3.55	2.83
Hickory.....	3.20	3.60	3.20	3.60
High Point.....	3.00	3.08	3.40	3.08
Hillsboro.....	2.88	2.88	2.68	2.88
Kernersville.....	3.00	3.00	3.40	3.00
Kinston.....	2.10	2.80	3.50	2.80
Laurel Hill.....	1.90	2.40	3.80	3.40
Laurinburg.....	1.90	3.40	3.80	3.40
Liberty.....	2.72	3.60	3.80	3.60
Louisburg.....	2.95	3.00	3.80	3.00
Lumberton.....	1.60	3.60	3.70	3.60
Macon.....	3.05	3.00	3.85	3.00
Madison.....	3.00	3.00	3.40	3.00
Matthews.....	2.60	3.20	3.20	3.20
Maxton.....	1.80	3.40	2.70	3.40
Milton.....	3.44	2.40	4.00	2.40
Mocksville.....	3.36	3.20	3.40	3.20
Morven.....	2.55	3.60	2.50	3.60
Mount Airy.....	3.20	3.40	3.80	3.40
Nashville.....	2.30	2.90	3.40	2.90
New Bern.....	1.25	1.75	3.95	1.75
Norwood.....	3.68	3.20	3.20	2.23
Oxford.....	3.04	2.83	3.55	2.83
Pineville.....	2.77	3.25	3.00	3.20
Pittsboro.....	2.60	3.30	4.10	3.30
Polkton.....	2.40	3.00	2.20	3.00
Raleigh.....	2.56	2.83	3.40	2.83
Reidsville.....	3.00	2.96	3.40	2.96
Rockingham.....	2.10	3.00	3.80	3.00
Rocky Mount.....	2.20	2.50	3.40	2.50
Ruffin.....	3.28	2.80	3.40	2.20
Rural Hall.....	3.28	3.20	3.60	3.20
Rutherfordton.....	3.05	3.65	3.05	3.65
Salisbury.....	3.25	3.20	3.20	3.20
Sanford.....	2.10	3.00	3.40	3.00
Selma.....	2.10	2.80	3.20	2.80
Shelby.....	2.90	3.60	3.90	3.60
Siler City.....	2.60	3.60	3.80	3.60
Smithfield.....	2.20	2.80	3.20	2.80
Statesville.....	3.50	3.20	3.60	3.20
Stem.....	2.95	2.83	3.80	2.83
Tarboro.....	2.30	2.40	3.00	2.40
Waco.....	2.90	3.60	3.40	3.60
Wadesboro.....	2.30	3.00	2.50	3.00
Walnut Cove.....	3.00	3.00	3.40	3.00
Warrenton.....	3.05	3.25	4.10	3.25
Warsaw.....	1.50	3.00	3.20	3.00
Washington.....	2.65	1.75	2.25	1.50
Weldon.....	2.95	1.90	3.85	1.90
Wilson.....	2.00	2.60	3.20	2.60
Winston-Salem.....	3.00	3.00	3.40	3.00

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.						Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	
MIXED FERTILIZERS.										
Brands claiming				8.00			1.65	2.00	2.00	\$ 15.83
8711	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Crown Brand Ammoniated Guano	Warrenton	5.27	1.10	1.06	2.16	2.63	2.28	15.67
8785	Chickamauga Fertilizer Works, Chattanooga, Tenn.	Chickamauga Standard Wheat Grower	Morganton	7.92	1.02	.56	1.58	1.92	2.12	15.62
8687	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano	Siler City	7.99	1.20	.50	1.70	2.07	2.03	16.05
8717	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Waynesville	7.82	.80	.94	1.74	2.11	2.43	16.50
8673	Martin, D. B., Co., Richmond, Va.	Martin's Old Virginia Favorite	High Point	7.43	.62	.86	1.42	1.80	2.25	14.93
8689	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Success Fertilizer	Siler City	8.34	1.20	.54	1.74	2.11	2.14	16.65
8672	Miller Fertilizer Works, Baltimore, Md.	Ammoniated Dissolved Bone	High Point	8.22	.98	.66	1.64	1.99	2.22	16.24
8690	Navassa Guano Co., Wilmington, N. C.	Navassa Grain Fertilizer	Goldston	8.34	1.02	.52	1.54	1.87	2.40	16.15
8698	Norfolk Guano Co., Norfolk, Va.	Oriana Crop Grower	Troy	8.34	.66	.82	1.48	1.80	2.15	15.64
8662	Patapsco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	Taylorsville	8.36	1.10	.58	1.68	2.04	1.99	16.26
8651	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Bone and Peruvian Mixture	Burlington	9.17	.22	1.06	1.28	1.56	1.70	15.11
8772	Pocahontas Guano Co., Lynchburg, Va.	Banner Brand High Grade Soluble Guano	Scmora	8.09	.80	.68	1.48	1.80	1.97	15.22
8618	Pocomoke Guano Co., Norfolk, Va.	Parilleo Superphosphate	Mebane	8.44	.72	.96	1.68	2.04	2.14	16.50
8701	Rasin-Monumental Co., Baltimore, Md.	Rasin's Empire Guano	Troy	9.21	.98	.84	1.82	2.21	1.85	17.42
8700	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer	Ashboro	9.05	.74	1.02	1.76	2.14	2.09	17.31
8686	Royster, F. S., Guano Co., Norfolk, Va.	Farmers Bone Fertilizer	Siler City	8.26	1.18	.50	1.68	2.04	2.09	16.28

8719	---do---	Royster's Special Wheat Fertilizer	Swannanoa	8.18	1.20	.56	1.76	2.14	1.88	16.29
8676	Swift Fertilizer Works, Atlanta, Ga.	Swift's Red Steer Guano	Randleman	8.20	.82	.52	1.34	1.63	1.98	14.78
8619	Tuscarora Fertilizer Co., Atlanta, Ga.	Tuscarora Standard	Mebane	9.47	.52	1.24	1.76	2.14	1.91	17.49
8677	Union Guano Co., Winston-Salem, N. C.	Old Honest Tobacco Guano	Randleman	9.20	1.02	.68	1.70	2.07	1.61	16.68
8720	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer	Asheville	9.37	.72	1.00	1.72	2.09	1.99	17.33
8750	---do---	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano	Hickory	8.87	.78	.66	1.44	1.75	1.73	15.50
8620	---do---	Davie & Whittle's Owl Brand Guano	Mebane	8.88	.98	.72	1.70	2.07	2.11	16.95
8650	---do---	Old Dominion Guano Co.'s Soluble Guano	Liberty	9.29	.98	.76	1.74	2.11	1.77	17.09
8763	---do---	Thinsley & Co.'s Stonewall Guano	Kent	9.17	.66	.72	1.38	1.68	1.86	15.68
8660	---do---	Travers & Co.'s Beef, Blood and Bone Fertilizer	Wilkesboro	9.95	1.02	.64	1.66	2.02	1.70	17.30
8688	---do---	Travers & Co.'s National Fertilizer	Goldsboro	8.32	.84	.56	1.40	1.70	2.71	15.93
Brands claiming				8.00			2.05	2.50	3.00	18.53
8663	Patapsco Guano Co., Baltimore, Md.	Unicorn Guano	Wilkesboro	8.32	1.36	.56	1.92	2.33	3.46	18.78
8753	Swift Fertilizer Works, Atlanta, Ga.	Swift's Special Blood Guano for Cotton	Mount Olive	8.88	1.16	.66	1.82	2.21	2.67	18.03
Brand claiming				8.00			2.26	2.75	2.50	18.76
8611	Hadley, Harris & Co., Wilson, N. C.	Hadley's Boss	Wilson	8.37	1.06	1.14	2.20		2.44	18.80
Brands claiming				8.00			2.47	3.00	3.00	20.13
8610	Columbia Guano Co., Norfolk, Va.	Ilyco Tobacco Guano	Wilson	8.15	1.52	1.18	2.70	3.28	2.75	20.89
8748	---do---	Olympia Cotton Guano	Hickory	8.41	1.50	.82	2.32	2.82	2.47	19.33
8716	Farmers Guano Co., Raleigh, N. C.	Golden Grade Guano	Waynesville	8.25	.72	1.56	2.28	2.77	2.51	19.08
8731	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer	Shelby	8.94	1.30	.94	2.24	2.72	2.92	19.99
8675	Royster, F. S., Guano Co., Norfolk, Va.	Marlboro High Grade Cotton Grower	Salisbury	8.08	1.84	.60	2.44	2.97	2.92	20.00
8742	Southern Cotton Oil Co., Rocky Mount, N. C.	Edgerton's Old Reliable	Faison	8.75	.90	1.46	2.36	2.87	2.80	20.16
8754	Swift Fertilizer Works, Atlanta, Ga.	Swift's Ruralist High Grade Guano	Mount Olive	8.17	1.52	.90	2.42	2.94	2.58	19.63
8661	Union Guano Co., Winston-Salem, N. C.	Union Homestead Guano	Statesville	9.74	1.54	.55	2.10	2.55	2.85	20.10

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Total Potash.	Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.			
MIXED FERTILIZERS.											
Brands claiming											
8759	Va.-Car. Chemical Co., Richmond, Va.	Adams' Special	Smithfield	8.00	.72	1.18	1.90	2.31	2.89	18.51	
8756	do	Diamond Cotton-seed Meal Guano	Smithfield	8.95	.82	1.30	2.12	2.58	3.44	20.11	
8760	do	Durham Fert. Co.'s Gold Medal Brand Guano.	Smithfield	8.20	1.52	.74	2.26	2.75	2.91	19.39	
8762	do	Norfolk and Carolina Chem. Co.'s Amazon High Grade Manure.	Smithfield	8.34	1.60	.78	2.38	2.89	2.91	19.99	
8761	do	Old Dominion Guano Co.'s Farmers' Friend H. G. Fertilizer.	Smithfield	8.91	1.10	1.00	2.10	2.55	2.97	19.47	
8758	do	Special High Grade Tobacco Fertilizer.	Smithfield	8.84	.86	1.20	2.06	2.50	2.81	19.08	
Brands claiming											
8741	Pearsall & Co., Wilmington, N. C.	Pearsall's Bone, Meal and Fish for Tobacco and Cotton.	Warsaw	7.04	1.46	1.32	2.78	3.38	3.91	21.48	
8743	Va.-Car. Chemical Co., Richmond, Va.	Southern Cotton Oil Co.'s Special Mixture.	Faison	8.60	1.34	1.62	2.96	3.60	3.46	23.09	
8755	do	V.-C. C. Co.'s Special	Mount Olive	8.98	1.46	1.36	2.82	3.43	4.16	23.66	
Brand claiming											
8612	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Best Guano	Wilson	8.00			3.70	4.50	7.00	29.33	
Brand claiming											
8691	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Superphosphate	Siler City	7.02	.58	2.30	2.88	3.50	5.01	23.06	
Brands claiming											
8724	American Fertilizer Co., Norfolk, Va.	American Bone Mixture	Shelby	8.50			1.65	2.00	2.00	16.25	
Brands claiming											
8724	American Fertilizer Co., Norfolk, Va.	American Bone Mixture	Shelby	9.00			1.64	1.99	1.85	15.93	
Brands claiming											
8724	American Fertilizer Co., Norfolk, Va.	American Bone Mixture	Shelby	8.65	.38	.52	.82	1.00	2.00	13.50	
Brands claiming											
8724	American Fertilizer Co., Norfolk, Va.	American Bone Mixture	Shelby	8.65	.38	.52	.90	1.09	1.87	13.35	

8784	Chickamauga Fertilizer Works, Chattanooga, Tenn.	Chickamauga Blood, Bone and Tankage Guano.	Morganton	8.58	.42	.64	1.06	1.29	2.20	14.28
8764	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Giant Grain and Grass Grower.	Brown Summit	9.46	.52	.40	.92	1.12	1.81	14.09
	Brands claiming			9.00			.82	1.00	3.00	14.60
8616	Armour Fertilizer Works, Atlanta, Ga.	Armour's Grain Grower Fertilizer.	Mebane	9.80	.30	.70	1.00	1.22	2.90	15.91
8786	Patapsco Guano Co., Baltimore, Md.	Coon Brand Guano	Forest City	9.22	.76	.30	1.06	1.29	2.88	15.60
8699	do.	do.	Pittsboro	9.14	.56	.38	.94	1.14	3.14	15.35
8787	Va.-Car. Chemical Co., Richmond, Va.	Bigelow's Crop Guano	Rutherfordton	10.26	.34	.46	.80	.97	3.13	15.80
	Brand claiming			9.00			1.65	2.00	2.00	15.63
8775	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Guano.	Durham	9.52	.84	.66	1.50	1.82	1.01	15.53
	Brand claiming			9.00			2.06	2.50	2.00	19.11
8757	Va.-Car. Chemical Co., Richmond, Va.	Prolific Cotton Grower	Kenly	10.34	.46	1.46	1.92	2.33	1.52	18.47
	Brand claiming			1.85			10.00	12.16		40.67
8710	Royster, F. S., Guano Co., Norfolk, Va.	Blood Tankage.	Cameron	3.21	.16	8.72	8.98	10.92		37.91
	Brand claiming			10.00			.82	1.00	3.00	15.46
8629	Canton Fertilizer Co., Canton, Ga.	Quickstep Wheat and Grain Grower.	Murphy	10.00	.18	.66	.84	1.03	3.79	15.65
	Brands claiming			8.00					4.00	11.60
8647	Acme Mfg. Co., Wilmington, N. C.	Acme Bone and Potash.	Walnut Cove.	8.55					4.07	12.17
8733	American Fertilizer Co., Norfolk, Va.	American Special Potash Mixture for Wheat.	Shelby	8.73					3.21	11.39
8628	Armour Fertilizer Works, Atlanta, Ga.	Armour's Phosphate and Potash Fertilizer, No. 3.	Hillsboro	8.29					3.54	11.35
8634	Canton Fertilizer Co., Canton, Ga.	Dissolved Bone and Potash.	Murphy	9.26					4.04	13.78
8737	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Buncombe Corn Grower.	Gastonia	9.67					3.72	12.79
8725	Farmers Guano Co., Raleigh, N. C.	Special Bone and Potash Mixture.	Waynesville	8.50					3.60	11.61
8643	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 8 and 4 Bone and Potash Mixture.	Rural Hall	8.21					3.85	11.62
8641	Union Guano Co., Winston-Salem, N. C.	Union Wheat Mixture.	Rural Hall	8.17					4.03	11.78
8696	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Carr's Special Wheat Guano.	Goldston	9.13					3.78	12.37
8732	do.	do.	Iron Station	7.75					3.89	11.25

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.					Total Potash.	Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.			
MIXED FERTILIZERS.											
Brands claiming											
8642	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Miller's Greensboro Special Wheat Mixture.		8 00					4 00	\$ 11.80	
Brands claiming											
8723	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Special Wheat Grower.	Asheville.	9.45					2 02	10 73	
8655	Conestee Chemical Co., Wilmington, N. C.	Conestee Bone and Potash.	Liberty.	10.47					2 71	12 40	
8781	Farmers Guano Co., Raleigh, N. C.	Century Bone and Potash.	Roxboro	9 73					2.26	11 24	
8780	Martin, D. B., Co., Baltimore, Md.	Martin's Potash and Soluble Bone Abattoir Product.	Roxboro	9.77					2 36	11.39	
8646	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone with Potash.	Mount Airy	10.45					1 62	11 19	
8789	Patapasco Guano Co., Baltimore, Md.	Patapasco Soluble Phosphate and Potash.	Eves Siding	9 70					2 01	10 84	
8766	Pocahontas Guano Co., Lynchburg, Va.	Carrington's Superior Grain Compound.	Ruffin.	10.85					1 75	11 69	
8631	Pocomoke Guano Co., Norfolk, Va.	Potash Mixture.	Sylva.	9 99					1 97	11.16	
8722	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Swannanoa	10.03					1 77	10 97	
8665	Swift Fertilizer Works, Atlanta, Ga.	Standard Grade Swift's Wheat Grower.	Elkin	10.00					2 24	11.46	
8682	Union Guano Co., Winston-Salem, N. C.	Union Bone and Potash.	High Point	12 88					86	12.54	
8788	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's McGavock's Special Potash Mixture.	Marion	11 02					1 78	11.88	
8776	do.	Davie & Whittle's Owl Brand Acid Phosphate with Potash.	Semora	10 00					3.71	13 08	

8624	do	Durham Fertilizer Co.'s Bone and Potash Mixture.	Hillsboro	11.02				2.19	12.33
8712	do	do	Henderson	10.87				1.88	11.85
8652	do	Lynchburg Guano Co.'s S. W. Sp ¹ Bone and Potash Mixture.	Liberty	11.52				3.34	14.04
8630	do	Owl Brand Acid Phosphate with Potash.	Dillsboro	9.99				1.48	10.62
8679	do	Southern Chemical Co.'s Mammoth Wheat and Grass Grower Special Potash Mixture.	Salisbury	9.82				1.67	10.67
8721	do	do	Swannanoa	10.91				1.98	12.00
8641	do	Tinsley & Co.'s Bone and Potash Mixture.	Pilot Mountain	11.19				1.54	11.76
8702	do	Travers & Co.'s Capital Bone and Potash Mixture.	Pittsboro	10.65				2.10	11.89
Brand claiming				10.50				1.50	11.10
8625	Va.-Car.	Chemical Co., Richmond, Va.	Burlington	11.02				1.46	11.52
Brand claiming				10.50				2.25	11.92
8654	Miller Fertilizer Co., Baltimore, Md.	Corn and Wheat Grower	Burlington	10.77				2.35	12.25
Brand claiming				10.00				3.00	12.30
8703	Union Guano Co., Winston, N. C.	Union Guano Co.'s Giant Phosphate and Potash.	Ashboro	9.70				2.73	11.73
Brands claiming				10.00				4.00	13.40
8734	American Fertilizer Co., Norfolk, Va.	Double Dissolved Bone and Potash.	Shelby	8.45				3.41	11.35
8627	Armour Fertilizer Works, Atlanta, Ga.	Armour's Superphosphate and Potash.	Mebane	10.09				3.75	13.20
8626	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Alkaline	Mebane	10.14				3.70	13.20
8633	Canton Fertilizer Co., Canton, Ga.	Special Potash Mixture.	Murphy	10.88				3.77	13.94
8736	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Special Caraleigh Bone and Potash Mixture.	Gastonia	10.57				3.79	13.68
8632	do	Special Bone and Potash Mixture.	Waynesville	10.59				3.36	13.23
8724	Farmers Guano Co., Raleigh, N. C.	do	Waynesville	8.48				5.25	13.44
8684	Imperial Co., Norfolk, Va.	Catawba Wheat Grower.	Greensboro	9.96				4.76	14.20
8685	Martin, D. B., Co., Baltimore, Md.	Martin's Potash and Soluble Bone	Randleman	11.84				2.74	13.67
8704	Miller Fertilizer Co., Baltimore, Md.	Miller Fert. Co.'s 10 and 4 Per Cent.	Pittsboro	13.90				1.52	14.18
8705	Norfolk Guano Co., Norfolk, Va.	Oriana Wheat Grower.	Troy	11.21				3.14	13.54

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Total Potash.	Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.			
MIXED FERTILIZERS.											
Brands claiming											
8666	Pocahontas Guano Co., Lynchburg, Va.	Wabash Wheat Mixture.	Taylorsville.	10 00					4 00	\$ 13 40	
8779	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 10 and 4 Bone and Potash Mixture.	Semora	9 99					3 53	10 87	
8645	Swift Fertilizer Works, Atlanta, Ga.	Swift's Farmers' Home H. G. Phosphate and Potash.	Mount Airy	9 88					3 77	13 04	
8778	do.	do.	Roxboro	10 83					3 75	13 87	
8664	Tuscarora Fertilizer Works, Atlanta, Ga.	Tuscarora Acid and Potash.	Elkin	10 78					3 71	13 75	
8683	Union Guano Co., Winston, N. C.	Quaker Grain Mixture.	Salisbury	10 82					3 80	13 92	
8653	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Special Potash Mixture.	Gibsonville	10 13					3 30	12 75	
8777	do.	V.-C. Fertilizer Co.'s XX Potash Mixture.	Durham	11 42					3 55	14 18	
Brand claiming											
8681	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Standard Bone and Potash.	Greensboro	10 93					3 73	13 94	
Brand claiming											
8725	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Horne & Son's High Grade Bone and Potash.	Gastonia	10 00					5 00	14 50	
Brand claiming											
8680	Va.-Car. Chemical Co., Richmond, Va.	Goodman's Special Potash Mixture.	Greensboro	10 54					4 08	13 97	
				11 00					5 00	15 40	
				10 92					4 48	14 76	
				12 00					5 00	16 30	
				12 73					5 64	17 66	

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.		Total Potash.
RAW OR UNMIXED FERTILIZER MATERIALS.									
	Brands claiming.			12.00					\$ 9.60
8727	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Dissolved Bone.	Asheville	13.09					10.47
8738	do.	Royster's Acid Phosphate.	Iron Station	11.79					9.43
8656	do.	Southern Chemical Co.'s Tar Heel Acid Phosphate.	Burlington	13.78					11.02
	Brands claiming			13.00					10.40
8740	American Fertilizer Co., Norfolk, Va.	Eagle Brand Acid Phosphate.	Shelby	14.39					11.51
8622	Armour Fertilizer Works, Atlanta, Ga.	Armour's Acid Phosphate Fertilizer.	Mebane	13.74					10.99
8671	Atlantic Chemical Co., Norfolk, Va.	Dissolved Bone.	Elkin	13.50					10.80
8636	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Acid Phosphate.	Waynesville	14.83					11.86
8768	Farmers Guano Co., Raleigh, N. C.	Farmers' Acid Phosphate.	McLeansville.	13.87					11.10
8695	Va.-Car. Chemical Co., Richmond, Va.	Durham Fert. Co.'s Double Bone Phosphate Extra Strong.	Goldston	14.60					11.68
	Brands claiming			14.00					11.20
8649	American Fertilizer Co., Norfolk, Va.	High Grade Acid Phosphate.	Rural Hall	14.52					11.62
8726	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s High Grade Acid Phosphate.	Asheville	14.43					11.54
8638	Canton Fertilizer Co., Canton, Ga.	High Grade Dissolved Bone.	Murphy	13.64					11.07
8715	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Climax Dissolved Bone.	Warrenton	14.28					11.12

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphate.	Water-Soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.		Total Potash.
RAW OR UNMIXED FERTILIZER MATERIALS.									
Brands claiming									
8790	Chickamauga Fertilizer Works, Chatanooga, Tenn.	Chickamauga High Grade Dissolved Bone.	Morganton.	14.00					\$ 11.20
8708	Miller Fertilizer Co., Baltimore, Md.	Acid Phosphate.	Pittsboro.	14.18					11.34
8791	Patapsco Guano Co., Baltimore, Md.	Patapsco Pure Dissolved S. C. Phosphate.	Eves Siding	15.25					12.20
8635	Pocomoke Guano Co., Norfolk, Va.	Peerless Acid Phosphate.	Sylva.	14.11					11.29
8658	Robertson Fertilizer Co., Norfolk, Va.	Scepter Brand Acid Phosphate.	Gibsonville.	15.76					12.61
8669	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Acid Phosphate.	Statesville.	14.39					11.51
8770	Union Guano Co., Winston-Salem, N. C.	Union High Grade Acid Phosphate.	Reidsville.	14.54					11.63
8771	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate.	Leaksville.	16.47					13.18
8713	do.	V.-C. Co.'s 14 Per Cent Acid Phosphate.	Henderson.	15.49					12.39
Brands claiming									
8623	Armour Fertilizer Works, Atlanta, Ga.	Armour's Acid Phosphate.	Mebane.	14.84					11.87
8670	Baugh & Sons Co., Philadelphia, Pa.	Baugh's 16 Per Cent Acid Phosphate.	Statesville.	16.00					12.80
8637	Canton Fertilizer Co., Canton, Ga.	High Grade Dissolved Bone.	Murphy.	16.07					12.86
8659	Conestee Chemical Co., Wilmington, N. C.	Conestee 16 Per Cent Acid Phosphate.	Liberty.	17.74					14.19
8767	Farmers Guano Co., Raleigh, N. C.	16 Per Cent Acid Phosphate.	Laurinburg.	16.82					13.46
8709	Miller's Fertilizer Co., Baltimore, Md.	Acid Phosphate.	Pittsboro.	15.67					12.54
				15.75					12.60

8692	Navassa Guano Co., Wilmington, N. C.	Navassa 16 Per Cent Acid Phosphate.	Goldston.	15.76	12.61
8707	Norfolk Guano Co., Norfolk, Va.	Oriana 16 Per Cent Acid Phosphate.	Troy	17.00	13.60
8769	Pocahontas Guano Co., Lynchburg, Va.	Carrington's S. C. Phosphate, Waukesha Brand.	Laurinburg	15.42	12.34
8706	Rasin-Monumental Co., Baltimore, Md.	Rasin's 16 Per Cent Acid Phosphate.	Troy	16.55	13.24
8739	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate.	Shelby	16.50	13.20
8792	Swift Fertilizer Works, Wilmington, N. C.	Swift's Special High Grade Acid Phosphate.	Rutherfordton	15.36	12.29
8668	Tuscarora Fertilizer Co., Atlanta, Ga.	Tuscarora Acid Phosphate.	Statesville	16.76	13.41
8794	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand High Grade Acid Phosphate.	Rutherfordton	16.27	13.02
8694	do.	Durham Fertilizer Co.'s Durham Best Acid Phosphate.	Goldston	16.36	13.09
8657	do.	Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate.	Liberty	16.33	13.06
8693	do.	S. W. Travers & Co.'s Champion Acid Phosphate.	Goldston	16.27	13.02
8714	do.	V.-C. C. Co.'s 16 Per Cent Acid Phosphate.	Henderson	15.68	12.34
8667	do.	Va. State Fertilizer Co.'s Bull Run Acid Phosphate.	Wilkesboro	16.81	13.45
	Brand claiming			17.00	13.60
8648	Tuscarora Fertilizer Co., Atlanta, Ga.	Tuscarora	Walnut Cove	18.29	14.63
	Brands claiming				12.00
8793	Union Guano Co., Winston-Salem, N. C.	Genuine German Kainit	Newton		11.82
8697	Va.-Car. Chemical Co., Richmond, Va.	do.	Siler City		12.66
	Brand claiming				48.00
8614	Union Guano Co., Winston-Salem, N. C.	Sulphate of Potash	Louisburg		47.35

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Percentage Composition of Parts per 100.

Relative Value
per Ton at
FactoryLaboratory
Number.

Name and Address of Manufacturer.

Name of Brand.

Where Sampled.

*Total
Phosphoric
Acid.Water-
soluble
Nitrogen.Organic
Nitrogen.Total
Nitrogen.Equivalent
to Ammonia.Total
Potash.

RAW OR UNMINED FERTILIZER MATERIALS.

	Brand claiming			20.59	3.70	4.50	\$ 27.73
8751	American Agricultural Chemical Co., New York, N. Y.	Pure Ground Bone	Hickory	21.95	3.56	4.33	28.18
	Brand claiming			21.00	3.29	4.00	26.60
8765	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Bone Meal	Leaksville	22.25	3.74	4.35	29.01
	Brand claiming			21.50	3.70	4.50	28.37
8621	Baugh & Sons Co., Norfolk, Va.	Baugh's Raw Bone Meal	Hillsboro	21.28	3.86	4.69	28.79
	Brand claiming			22.50	3.71	4.50	29.11
8678	Union Guano Co., Winston-Salem, N. C.	Pure Raw Bone Animal Meal	Salisbury	19.85	3.78	4.60	27.50
	Brand claiming			12.00	2.80	3.40	21.52
8640	Peruvian Guano Co., Charleston, S. C.	Genuine Peruvian Guano	Mount Airy	14.33	3.06	3.72	23.30

*Total Phosphoric Acid in Bone Meal, Peruvian Guano and Thomas Phosphate valued at 3½ cents per pound.

II. BRANDS REGISTERED, SEASON 1910-1911.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Raw Bone Meal.....Total	20.25	3.71	....
Atlantic High Grade 16 Per Cent Acid Phosphate	16.00	....	....
Atlantic 14 Per Cent Acid Phosphate.....	14.00	....	....
Atlantic Dissolved Bone	13.00	....	....
Atlantic Acid Phosphate	12.00	....	....
Atlantic 10 and 5 Bone and Potash Mixture..	10.00	....	5.00
Atlantic 10 and 4 Bone and Potash Mixture..	10.00	....	4.00
Atlantic Bone and Potash for Grain.....	10.00	....	3.00
Atlantic Bone and Potash Mixture.....	10.00	....	2.00
Atlantic Meal Compound.....	9.00	2.27	2.00
Atlantic Cotton Grower.....	9.00	2.06	1.00
Corona Cotton Compound.....	9.00	1.65	3.00
Atlantic Special Guano.....	9.00	1.65	1.00
Atlantic Special Truck Guano.....	8.00	3.30	4.00
Oriental High Grade Guano.....	8.00	3.30	4.00
Paloma Tobacco Guano.....	8.00	3.30	4.00
Boon's Special Guano.....	8.00	2.47	4.00
Atlantic High Grade Tobacco Guano.....	8.00	2.47	3.00
Atlantic High Grade Cotton Guano.....	8.00	2.47	3.00
Atlantic Tobacco Grower.....	8.00	2.06	3.00
Atlantic Tobacco Compound.....	8.00	2.06	2.00
Atlantic Special Wheat Fertilizer.....	8.00	1.65	2.00
Atlantic Soluble Guano.....	8.00	1.65	2.00
Apex Peanut Grower.....	8.00	1.02	4.00
Atlantic 8 and 5 Bone and Potash Mixture...	8.00	....	5.00
Atlantic 8 and 4 Bone and Potash Mixture...	8.00	....	4.00
Atlantic 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Atlantic Potato Guano.....	7.00	4.12	5.00
Perfection Peanut Grower.....	7.00	....	5.00
Atlantic Side Dresser.....	4.00	8.22	4.00
Atlantic Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Atlantic Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Geo. L. Arps & Co., Norfolk, Va.—

Arps' H. G. 16 Per Cent Acid Phosphate....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Arps' 10 and 2 Bone and Potash Mixture....	10.00	....	2.00
Arps' "Go-a-Head" Guano for Trucks, Cotton and Tobacco.....	8.00	3.30	4.00
Arps' Tobacco Guano	8.00	2.47	3.00
Arps' Quick Growth for All Crops.....	8.00	2.47	3.00
Arps' Premium Guano for Cotton, Tobacco and All Spring Crops.....	8.00	1.65	2.00
Geo. L. Arps & Co.'s Big Yield Guano.....	8.00	1.65	2.00
Arps' Standard Truck Guano.....	7.00	4.12	5.00
Arps' Potato Guano	6.00	5.76	5.00
Arps' Seuppernong Guano for Trucks.....	6.00	4.12	7.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Atlantic Fertilizer Company, Atlanta, Ga.—</i>			
Atlantic "N" High Grade Acid Phosphate....	16.00	....	....
Atlantic "O" High Grade Acid Phosphate....	14.00	....	....
Atlantic "P" Standard Grade Acid Phosphate....	13.00	....	....
Atlantic "A" High Grade Guano.....	10.00	2.47	3.00
Atlantic "G" High Grade Guano.....	10.00	1.65	2.00
Atlantic "K" High Grade Phosphate and Potash.....	10.00	....	4.00
Atlantic "M" Standard Grade Phosphate and Potash.....	10.00	....	2.00
Atlantic "D" High Grade Guano.....	9.00	1.65	3.00
Atlantic "F" Cotton-seed Meal Comp. H. G..	9.00	1.65	3.00
Atlantic "B" High Grade Guano.....	8.00	3.29	4.00
Atlantic "C" High Grade Guano.....	8.00	2.47	3.00
Atlantic "E" Cotton-seed Meal Comp. H. G..	8.00	2.47	3.00
Atlantic "H" Standard Grade Guano.....	8.00	1.65	2.00
Atlantic "I" Standard Grade Guano.....	8.00	.82	4.00
Atlantic "L" Standard Grade Phosphate and Potash.....	8.00	....	4.00
Atlantic Nitrate of Soda.....	....	15.22	....
Atlantic Muriate of Potash.....	....	....	50.00
Atlantic Sulphate of Potash.....	....	....	49.00
Atlantic German Kainit.....	....	....	12.40

Acme Manufacturing Co., Wilmington, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Acme High Grade Acid Phosphate.....	14.00	....	....
Acme Acid Phosphate.....	13.00	....	....
Acme Bone and Potash.....	12.00	....	6.00
Acme Bone and Potash.....	12.00	....	5.00
Acme Bone and Potash.....	12.00	....	4.00
Acme Bone and Potash.....	12.00	....	3.00
Acme Bone and Potash.....	12.00	....	2.00
Acme Bone and Potash.....	11.00	....	6.00
Acme Bone and Potash.....	11.00	....	5.00
Acme Bone and Potash.....	11.00	....	4.00
Acme Bone and Potash.....	11.00	....	3.00
Acme Bone and Potash.....	11.00	....	2.00
Acme Bone and Potash.....	10.00	....	6.00
Acme Melon Grower.....	10.00	3.30	5.00
Acme Bone and Potash.....	10.00	....	5.00
Acme Bone and Potash.....	10.00	....	4.00
Acme Bone and Potash.....	10.00	....	3.00
Acme Bone and Potash.....	10.00	....	2.00
Acme Cotton Grower.....	9.00	2.27	2.00
Acme Special Fertilizer for Cotton.....	8.00	4.12	7.00
Acme Plumb Good Fertilizer.....	8.00	3.30	6.00
Acme "OK" Fertilizer.....	8.00	3.30	4.00
Quickstep Fertilizer.....	8.00	3.30	4.00
Quickstep Fertilizer for Tobacco.....	8.00	3.30	4.00
Acme Crop Grower.....	8.00	2.47	4.00
Currie's High Grade Fertilizer.....	8.00	2.47	4.00
Best's Fish Scrap Guano.....	8.00	2.47	3.00
Pee Dee Special Fertilizer.....	8.00	2.47	3.00
Pee Dee Special for Tobacco.....	8.00	2.47	3.00
Acme Plant Food.....	8.00	2.47	2.50
Acme Fertilizer for Tobacco.....	8.00	2.47	2.50
Acme Fertilizer.....	8.00	2.47	2.50
Tiptop Crop Grower.....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Tiptop Tobacco Grower.....	8.00	2.06	3.00
Lattimer's Complete Fertilizer.....	8.00	2.06	2.00
Best's Complete Fertilizer.....	8.00	2.06	2.00
Gem Fertilizer.....	8.00	1.65	2.00
Gem Fertilizer for Tobacco.....	8.00	1.65	2.00
Acme Special Grain Fertilizer.....	8.00	1.65	2.00
Acme Bone and Potash.....	8.00	....	6.00
Acme Bone and Potash.....	8.00	....	5.00
Acme Bone and Potash.....	8.00	....	4.00
Acme Root Crop Guano.....	7.00	4.12	7.00
Acme Standard Truck Guano.....	7.00	4.12	5.00
Acme High Grade Guano.....	6.00	4.95	8.00
Acme Truck Grower.....	6.00	3.30	8.00
Acme Corn Guano.....	6.00	2.47	3.00
Acme Special 4-10-4 Guano.....	4.00	8.25	4.00
Clark's Corn Guano.....	1.00	6.58	10.00
Nitrate of Soda.....	....	14.83	....
Sulphate of Ammonia.....	....	20.62	....
Acme Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	48.00
Muriate of Potash.....	....	....	48.00
High Grade German Kainit.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Ashepoo Fertilizer Co., Charleston, S. C.—

High Grade Ashepoo Dissolved Phosphate....	16.00	....	....
High Grade Ashepoo Acid Phosphate.....	14.00	....	....
High Grade Ashepoo XXXX Acid Phosphate..	14.00	....	....
High Grade Eutaw Acid Phosphate.....	14.00	....	....
Standard Ashepoo XXX Acid Phosphate....	13.00	....	....
Standard Ashepoo Dissolved Bone.....	13.00	....	....
Standard Eutaw XXX Acid Phosphate.....	13.00	....	....
Standard Carolina Acid Phosphate.....	13.00	....	....
Standard Circle Bone.....	13.00	....	....
H. G. Ashepoo Bone and Potash.....	12.00	....	2.00
Standard Ashepoo Acid Phosphate and Potash	12.00	....	1.00
Standard Eutaw Acid Phosphate and Potash.	12.00	....	1.00
Standard Eutaw XX Acid Phosphate.....	12.00	....	....
Standard Coomassie Acid Phosphate.....	12.00	....	....
Standard Ashepoo XX Acid Phosphate.....	12.00	....	....
Standard Ashepoo Potash and Acid Phosphate	11.00	....	1.00
Standard Eutaw Potash Acid Phosphate....	11.00	....	1.00
Standard Palmetto Potash Acid Phosphate...	11.00	....	1.00
High Grade Ashepoo Watermelon Guano....	10.00	3.29	5.00
H. G. Ashepoo Cantaloupe Guano.....	10.00	2.46	10.00
Taylor's XX Ammoniated Dissolved Fertilizer,	10.00	.82	1.00
H. G. Eutaw Superpotash Acid Phosphate...	10.00	....	4.00
High Grade Ashepoo Superpotash Acid Phos- phate.....	10.00	....	4.00
Standard Ashepoo Potash Compound.....	10.00	....	3.00
Standard Enoree Acid Phosphate and Potash,	10.00	....	2.00
Standard Ashepoo Wheat and Oats Specific..	9.50	1.65	1.00
Standard Ashepoo Fertilizer.....	9.00	1.85	1.00
Standard Eutaw Fertilizer.....	9.00	1.85	1.00
High Grade Taylor's Circle Guano.....	9.00	1.65	4.00
Standard Ashepoo Harrow Brand Raw Bone Superphosphate.....	9.00	1.65	2.00
Standard Eutaw XXX Guano.....	9.00	1.65	2.00
Standard Ashepoo Guano.....	8.50	2.06	1.00
Standard Eutaw XX Guano.....	8.50	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Ashepoo XX Guano.....	8.50	1.65	2.00
High Grade Ashepoo Fruit Grower.....	8.00	3.91	2.75
High Grade Ashepoo Perfection Guano.....	8.00	3.29	6.00
High Grade Ashepoo Guano.....	8.00	3.29	4.00
High Grade Entaw X Golden Fertilizer.....	8.00	2.46	4.00
High Grade Ashepoo Bird and Fish Guano...	8.00	2.46	3.00
High Grade Ashepoo Meal Mixture.....	8.00	2.46	3.00
High Grade Ashepoo X Tobacco Fertilizer...	8.00	2.46	3.00
High Grade Ashepoo Golden Tobacco Producer	8.00	2.46	3.00
High Grade Carolina XXX Guano.....	8.00	2.46	3.00
High Grade Ashepoo Ammoniated Superphos- phate	8.00	2.46	2.00
High Grade Entaw Special Cotton-seed Meal Guano	8.00	2.46	2.00
High Grade Ashepoo Farmers' Special.....	8.00	2.06	3.00
Standard Entaw Circle Guano.....	8.00	2.06	2.00
Standard Ashepoo Circle Guano.....	8.00	2.06	2.00
Standard Coomassie Circle Fertilizer.....	8.00	1.65	2.00
Standard Carolina Guano	8.00	1.65	2.00
Standard P. D. Fertilizer.....	8.00	1.65	2.00
Standard Ashepoo XXX Guano.....	8.00	1.65	2.00
Standard Ashepoo Special Fertilizer.....	8.00	1.65	2.00
Standard Bronwood Acid Phosphate.....	8.00	....	4.00
High Grade Ashepoo Truck Guano.....	7.00	4.12	5.00
High Grade Ashepoo Vegetable Guano.....	5.00	4.12	5.00
High Grade Ashepoo Nitrogenous Top Dress- ing	3.00	7.00	2.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	45.00
German Kainit .....	....	....	12.00

*The Armour Fertilizer Works, Atlanta, Chicago
and Wilmington—*

Armour's Raw Bone Meal.....Total	22.00	3.70	....
17 Per Cent Acid Phosphate.....	17.00	....	....
16 Per Cent Acid Phosphate.....	16.00	....	....
Star Phosphate	14.00	....	....
13 Per Cent Acid Phosphate.....	13.00	....	....
12 Per Cent Acid Phosphate.....	12.00	....	....
Ammoniated Dissolved Bone and Potash....	10.00	1.65	2.00
Phosphoric Acid and Potash.....	10.00	....	5.00
Superphosphate and Potash.....	10.00	....	4.00
M. H. White & Co.'s Special Corn Mixture...	10.00	....	2.00
Phosphate and Potash No. 1.....	10.00	....	2.00
African Cotton Grower.....	9.00	2.47	3.00
Bone and Dissolved Bone with Potash.....	9.00	1.65	3.00
Standard Cotton Grower.....	8.50	1.65	2.00
Bone, Blood and Potash.....	8.00	4.11	7.00
Van Lindley's Special.....	8.00	4.11	2.00
Fertilizer No. 846.....	8.00	3.30	6.00
Fertilizer No. 844.....	8.00	3.30	4.00
Special Truckee	8.00	3.30	4.00
All Soluble	8.00	2.88	4.00
Truck and Berry Special.....	8.00	2.47	10.00
Fertilizer No. 836.....	8.00	2.47	6.00
Cotton Special	8.00	2.47	3.00
Tobacco Special	8.00	2.47	3.00
Truckers Special	8.00	2.47	3.00
Carolina Cotton Grower.....	8.00	2.47	2.00
Berry King	8.00	2.05	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Gold Medal for Tobacco.....	8.00	2.05	3.00
Sweet Potato Special.....	8.00	2.05	3.00
Champion	8.00	2.05	2.50
King Cotton	8.00	2.05	2.00
High Grade Potato.....	8.00	1.65	10.00
Fruit and Root Crop Special.....	8.00	1.65	5.00
Carolina Cotton Special.....	8.00	1.65	3.00
Armour's Slaughter House Fertilizer.....	8.00	1.65	2.00
General	8.00	1.65	2.00
Phosphate and Potash No. 2.....	8.00	....	5.00
Phosphate and Potash No. 3.....	8.00	....	4.00
7 Per Cent Trucker.....	6.00	5.76	5.00
5 Per Cent Trucker.....	6.00	4.11	7.00
Manure Substitute	6.00	3.30	4.00
10 Per Cent Trucker.....	5.00	8.24	3.00
Top Dresser	5.00	8.24	2.00
Special Formula for Tobacco.....	4.00	3.30	5.00
Harvey's Special	4.00	3.30	4.00
10 Per Cent Tankage.....	2.00	8.24	....
Nitrate of Soda.....	....	14.81	....
Dried Blood .....	....	13.16	....
Armour's Top Dresser .....	....	7.82	4.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

American Fertilizing Co., Norfolk, Va.—

Bone Meal	Total	22.50	3.71	....
American High Grade Acid Phosphate.....		16.00	....	....
High Grade Acid Phosphate.....		14.00	....	....
Eagle Brand Acid Phosphate.....		13.00	....	....
Double Extra Bone and Potash.....		12.00	....	5.00
Acid Phosphate		12.00	....	....
American Standard Cotton Grower.....		10.00	1.65	2.00
American Formula for Wheat and Corn.....		10.00	....	5.00
Double Dissolved Bone and Potash.....		10.00	....	4.00
Dissolved Bone and Potash for Corn and Wheat		10.00	....	2.00
Strawberry and Asparagus Guano.....		9.00	2.88	9.00
Pitt County Special Fertilizer.....		9.00	2.88	5.00
Special Formula Guano for Yellow Leaf To- bacco		9.00	2.88	5.00
American Bone Mixture.....		9.00	.83	2.00
Blood and Bone Compound.....		8.50	2.06	1.00
Peruvian Mixture		8.50	1.65	1.50
Peruvian Mixture Guano Especially Prepared for Sweet Potatoes.....		8.00	3.29	5.00
N. C. and S. C. Cotton Grower.....		8.00	3.29	4.00
American Nonpareil Tobacco Grower.....		8.00	3.29	4.00
American Eagle Guano		8.00	2.47	3.00
J. G. Miller & Co.'s Yellow Leaf Fertilizer....		8.00	2.47	3.00
American No. 1 Fertilizer.....		8.00	2.06	3.00
Bob White Fertilizer for Tobacco.....		8.00	2.06	1.50
A. L. Hanna's Special.....		8.00	1.65	2.00
American No. 2 Fertilizer.....		8.00	1.65	2.00
American Special Potash Mixture for Wheat.		8.00	....	4.00
10 Per Cent Ammoniated Guano.....		7.00	8.24	2.50
American 7-7-7 for Irish Potatoes.....		7.00	5.76	7.00
Standard 7 Per Cent Ammonia Guano.....		7.00	5.76	5.00
Special Potato Guano.....		7.00	4.12	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Kale, Spinach and Cabbage Guano.....	7.00	4.12	4.00
American Fish Scrap Guano.....	7.00	3.29	4.00
Stable Manure Substitute.....	7.00	2.47	4.00
Special Potato Manure.....	6.00	4.12	7.00
Nitrate of Soda.....	....	14.83	....
Ground Fish Scraps.....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Gemine German Kainit.....	....	....	12.00

*American Agricultural Chemical Co., Baltimore
and New York—*

Fine Ground Bone.....Total	22.88	2.47	....
Pure Ground Bone.....Total	20.59	3.70	....
Superphosphate	16.00	....	....
Canton Baker's Dissolved S. C. Phosphate....	14.00	....	....
Detrick's XXtra Acid Phosphate.....	14.00	....	....
Lazaretto Acid Phosphate	14.00	....	....
Zell's Dissolved Phosphate.....	14.00	....	....
Zell's Acid Phosphate	13.00	....	....
Canton Chemical Gem Phosphate	12.00	....	....
Southern Wheat Grower.....	12.00	....	6.00
Detrick's Victory Alkaline Bone.....	12.00	....	5.00
Lazaretto High Grade Dissolved Phosphate and Potash	12.00	....	5.00
Canton Soluble Alkaline Phosphate.....	12.00	....	3.00
Detrick's P. & B. Special Fertilizer.....	12.00	....	3.00
Lazaretto Alkaline Bone Phosphate.....	12.00	....	3.00
New Rival Crop Producer.....	10.00	.82	1.00
Zell's High Grade Potash Fertilizer.....	10.00	....	4.00
Royal Alkaline Bone.....	10.00	....	4.00
Canton Soluble Phosphate Potash.....	10.00	....	2.00
Detrick's Soluble Phosphate and Potash....	10.00	....	2.00
Lazaretto Dissolved Phosphate and Potash...	10.00	....	2.00
Zell's Electric Phosphate	10.00	....	2.00
Special Tobacco Fertilizer.....	9.00	2.47	3.00
Holmes & Dawson's Productive Cotton and Peanut Grower	9.00	2.47	2.00
Zell's Royal High Grade Fertilizer.....	9.00	2.06	2.00
Zell's Victoria Animal Bone Compound.....	9.00	1.85	4.00
Canton Chemical Animal Bone Fertilizer....	9.00	1.85	4.00
Detrick's Superior Animal Bone Fertilizer...	9.00	1.85	4.00
Holmes & Dawson's Gold Dust Guano.....	9.00	1.65	2.00
Lazaretto Retriever Animal Bone Fertilizer..	9.00	1.85	4.00
Lazaretto Peanut Grower	9.00	.82	3.00
Reese Pacific Guano for Tobacco.....	8.50	2.47	2.50
Lazaretto Manure Substitute	8.00	3.29	4.00
Lazaretto Carolina Cotton Food.....	8.00	3.29	4.00
Detrick's Quick Step for Potatoes and To- bacco	8.00	2.47	4.00
Zell's Special Compound for Potatoes and Veg- etables	8.00	2.47	4.00
Zell's Tobacco Fertilizer	8.00	2.47	4.00
Zell's Bright Tobacco Grower.....	8.00	2.47	3.00
Zell's Reliance High Grade Manure.....	8.00	2.47	3.00
Canton Chemical Baker's Tobacco Fertilizer.	8.00	2.47	3.00
Canton Chemical Superior High Grade Fertil- izer	8.00	2.47	3.00
Detrick's Special Tobacco Fertilizer.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Lazaretto Challenge Fertilizer	8.00	2.47	3.00
Lazaretto Special Tobacco and Potato Fertilizer	8.00	2.47	3.00
Canton Chemical CCC Special Compound....	8.00	2.06	6.00
Canton Chemical Baker's Standard High Grade Guano	8.00	2.06	3.00
Detrick's Vegetator Ammoniated Superphosphate	8.00	2.06	3.00
Lazaretto Climax Plant Food.....	8.00	2.06	3.00
Slingluff's British Mixture.....	8.00	2.06	2.50
Lazaretto Universal Compound	8.00	2.06	2.00
Canton Chemical Virginia Standard Manure..	8.00	2.06	2.00
Detrick's Kangaroo Komplete Kompond.....	8.00	1.65	3.00
Canton Chemical Baker's Fish Guano.....	8.00	1.65	2.00
Canton Chemical Game Guano.....	8.00	1.65	2.00
Detrick's Royal Crop Grower.....	8.00	1.65	2.00
Detrick's Fish Mixture	8.00	1.65	2.00
Holmes & Dawson's Dawson's Crop Maker...	8.00	1.65	2.00
Holmes & Dawson's Triumph Soluble.....	8.00	1.65	2.00
Lazaretto Crop Grower.....	8.00	1.65	2.00
Reese Pacific Guano	8.00	1.65	2.00
Zell's Special Compound for Tobacco.....	8.00	1.65	2.00
Zell's Calvert Guano	8.00	1.65	2.00
Zell's Ammoniated Superphosphate	8.00	1.65	2.00
Zell's Fish Guano	8.00	1.65	2.00
Savage, Son & Co. Purity Guano.....	8.00	1.65	2.00
Fidelity Crop Grower.....	8.00	.82	3.00
Enterprise Alkaline Bone.....	8.00	....	5.00
Palmetto Alkaline Phosphate.....	8.00	....	4.00
Canton Chemical Excelsior Trucker.....	7.00	4.11	5.00
Detrick's Special Trucker	7.00	4.11	5.00
Lazaretto Early Trucker	7.00	4.11	5.00
Zell's Truck Grower	7.00	4.11	5.00
Empire Trucker	7.00	3.29	4.00
Zell's 7 Per Cent Potato and Vegetable Manure	6.00	5.76	5.00
Canton Chemical Truckers' Special 7 Per Cent.	6.00	5.76	5.00
Detrick's Gold Basis	6.00	5.76	5.00
Lazaretto Truckers' Favorite.....	6.00	5.76	5.00
Bull Head Potato and Vegetable Manure....	6.00	4.11	7.00
Detrick's Gold Eagle.....	6.00	2.47	6.00
Zell's 10 Per Cent Trucker.....	5.00	8.23	3.00
Nitrate of Soda.....	....	15.00	....
Special H. G. Dried Blood.....	....	13.16	....
Dry Ground Fish.....	....	8.23	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

A. D. Adair & McCarty Bros., Atlanta, Ga.—

Adair's High Grade Dissolved Bone, No. 16..	16.00
Adair's High Grade Dissolved Bone.....	14.00	....	....
A. & M. 13-4.....	13.00	....	4.00
McCarty's Potash Formula, No. 5.....	12.00	....	5.00
McCarty's Potash Formula, No. 4.....	12.00	....	4.00
McCarty's Potash Formula.....	12.00	....	2.00
Adair's Dissolved Bone.....	12.00	....	....
David Harum Extra High Grade Blood Guano.	10.00	3.30	4.00
Adair's H. G. Blood and Bone.....	10.00	2.47	3.00
Special Wheat Compound.....	10.00	1.65	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Special Corn Compound.....	10.00	1.65	4.00
Special Vegetable Compound.....	10.00	1.65	4.00
Special Potato Compound.....	10.00	1.65	4.00
Special Cotton Compound.....	10.00	1.65	4.00
Special Tomato Compound.....	10.00	1.65	4.00
Adair's Soluble Pacific Guano.....	10.00	1.65	2.00
McCarty's High Grade Cotton Grower.....	10.00	1.65	2.00
McCarty's High Grade Corn Grower.....	10.00	1.65	2.00
Old Time Fish Scrap Guano.....	10.00	1.65	2.00
McCarty's Wheat Special.....	10.00	.82	3.00
McCarty's Corn Special.....	10.00	.82	3.00
McCarty's Cotton Special.....	10.00	.82	3.00
Adair's Wheat and Corn Grower, No. 8.....	10.00	....	8.00
H. G. Potash Compound, No. 8.....	10.00	....	8.00
H. G. Potash Compound, No. 6.....	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 6.....	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 5.....	10.00	....	5.00
H. G. Potash Compound, No. 5.....	10.00	....	5.00
High Grade Potash Compound.....	10.00	....	4.00
Adair's Wheat and Corn Grower.....	10.00	....	4.00
Adair's Formula.....	10.00	....	2.00
Adair's Blood, Bone and Tankage Guano....	9.00	.82	2.00
Special Corn Grower.....	8.00	1.65	6.00
Special Wheat Grower.....	8.00	1.65	6.00
Special Potato Grower.....	8.00	1.65	6.00
Special Vegetable Grower.....	8.00	1.65	6.00
Standard Corn Grower.....	8.00	1.65	2.00
Planters' Soluble Fertilizer.....	8.00	1.65	2.00
Adair's Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Golden Grain Compound.....	8.00	.82	3.00
Adair's Special Potash Mixture, No. 6.....	8.00	....	6.00
Adair's Special Potash Mixture, No. 5.....	8.00	....	5.00
Adair's Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	50.00

Asheville Packing Co., Asheville, N. C.—

Asheville Packing Co.'s Pure Bone Meal.			
Total	18.00	2.00	....
Asheville Packing Co.'s H. G. Phosphoric Acid	16.00	....	....
Asheville Packing Co.'s Standard Phosphoric Acid	14.00	....	....
Asheville Packing Co.'s Extra H. G. Potash Mixture	13.00	....	4.00
Asheville Packing Co.'s Standard Phosphoric Acid	12.00	....	....
Asheville Packing Co.'s Celebrated Tankage, Total	10.00	4.12	....
Asheville Packing Co.'s Extra H. G. Fertilizer	10.00	3.30	4.00
Asheville Packing Co.'s Blood and Bone.....	10.00	2.47	3.00
Asheville Packing Co.'s Extra H. G. Cotton Special	10.00	1.65	4.00
Asheville Packing Co.'s High Grade Biltmore Wheat Grower	10.00	1.65	3.00
Asheville Packing Co.'s H. G. Wheat, Corn and Oat Special.....	10.00	1.65	2.00
Asheville Packing Co.'s Standard Bone and Potash	10.00	.82	1.00
Asheville Packing Co.'s Superior Potato and Wheat Fertilizer	10.00	....	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Asheville Packing Co.'s Special Potash Mix- ture	10.00	....	4.00
Asheville Packing Co.'s XXX Wheat Grower.	10.00	....	2.00
Asheville Packing Co.'s Standard Potato Fer- tilizer	9.00	.82	2.00
Asheville Packing Co.'s Extra H. G. Vegetable Special	8.00	4.12	5.00
Asheville Packing Co.'s Corn and Vegetable Special	8.00	2.47	3.00
Asheville Packing Co.'s Special Tobacco and Vegetable Fertilizer	8.00	2.47	3.00
Asheville Packing Co.'s Fruit Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Potato Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Champion Potato Fer- tilizer	8.00	1.65	4.00
Asheville Packing Co.'s Complete Fertilizer..	8.00	1.65	2.00
Asheville Packing Co.'s Standard Corn and Wheat	8.00	.82	3.00
Asheville Packing Co.'s Special Bone and Potash	8.00	....	4.00
Asheville Packing Co.'s H. G. Muriate of Pot- ash .....	....	....	50.00

Baugh & Sons Co., Phila., Pa., and Norfolk, Va.—

Baugh's Raw Bone Meal, Warranted Pure.			
Total	21.50	3.70	....
Baugh's 16 Per Cent Acid Phosphate.....	16.00	....	....
Baugh's Pure Bone and Muriate of Potash Mixture	15.00	2.47	5.00
Baugh's High Grade Acid Phosphate.....	14.00	....	....
Baugh's Pure Dissolved Animal Bones.....	13.00	2.06	....
Baugh's 12 and 5 Phosphate and Potash.....	12.00	....	5.00
Baugh's High Grade Cotton and Truck Guano	10.00	1.65	2.00
Baugh's High Grade Potash Mixture.....	10.00	....	4.00
Baugh's Soluble Alkaline Superphosphate....	10.00	....	2.00
Hassell's Tobacco Guano.....	9.00	2.26	2.00
Baugh's Fish, Bone and Potash.....	8.00	3.30	4.00
Baugh's Fruit and Berry Guano.....	8.00	2.47	10.00
Baugh's Special Tobacco Guano.....	8.00	2.47	5.00
Baugh's Grand Rapids High Grade Truck Guano	8.00	2.47	3.00
Baugh's Sweet Potato Guano for Sweet Pota- toes, Peas and Melons.....	8.00	2.47	3.00
Baugh's High Grade Tobacco Guano.....	8.00	2.47	3.00
Baugh's Complete Animal Base Fertilizer....	8.00	1.65	5.00
Baugh's Fish Mixture	8.00	1.65	2.00
Baugh's Animal Base and Potash Compound for All Crops.....	8.00	1.65	2.00
Baugh's Wheat Fertilizer for Wheat and Grass	8.00	1.65	2.00
Baugh's Southern States Excelsior Guano....	8.00	1.00	3.00
Glover's Special Potato Guano.....	7.00	3.30	8.00
Baugh's Southern States Guano for Bright Tobacco	7.00	2.88	7.00
Baugh's Potato and Truck Special.....	7.00	2.88	7.00
Baugh's Strawberry Mixture	7.00	2.47	5.00
Baugh's Fine Ground Fish.....	6.87	8.23	....
Baugh's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
Baugh's Peruvian Guano Substitute for Pota- toes and All Vegetables.....	6.00	4.12	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Baugh's 5-6-5 Guano	6.00	4.12	5.00
Baugh's New Process 10 Per Cent Guano....	5.00	8.23	2.50
Baugh's Special Potato Manure.....	5.00	1.65	10.00
Baugh's Wrapper Leaf Brand for Seed Leaf Tobacco	3.50	3.30	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.23	....
Baugh's Fine Ground Dried Blood.....	....	13.16	....
Fine Ground Blood.....	....	13.00	....
Baugh's Soluble Top Dresser for All Crops..	....	8.23	3.00
Baugh's Fine Ground Tankage.....	....	7.40	....
Muriate of Potash.....	....	....	48.00
High Grade Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>M. J. Best & Sons, Goldsboro, N. C.—</i>			
Pure German Kainit.....	....	....	12.00
<i>J. A. Benton, Ruffin, N. C.—</i>			
Benton's North Carolina Bright Fertilizer....	9.00	1.65	2.00
<i>Baltimore Fertilizer Co., Baltimore, Md.—</i>			
Honest Acid Phosphate.....	14.00	....	....
Honest Bone and Potash.....	10.00	....	2.00
Honest Sweet Potato Grower.....	8.00	2.40	4.00
Honest Ammoniated Bone.....	8.00	1.60	2.00
Honest Revenue	7.00	2.40	6.00
Honest Success	7.00	.82	4.00
Honest Dixie Trucker	6.00	4.00	7.00
Honest Trucker	6.00	4.00	5.00
<i>Bertie Cotton Oil Co., Aulander, N. C.—</i>			
Bertie's High Grade Guano.....	8.00	4.13	5.00
Bertie's Meal Mixture.....	8.00	3.30	4.00
Bertie's Tobacco Grower.....	8.00	2.47	5.00
Bertie's Ideal Cotton Grower.....	8.00	2.47	3.00
Bertie's Special Compound	8.00	1.65	2.00
Bertie's Corn Mixture.....	7.00	2.47	2.00
Jumbo Peanut Grower.....	7.00	1.65	5.00
Bertie's Peanut Special.....	7.00	.82	4.00
Tar Heel Top Dresser.....	2.00	8.25	5.00
Nitrate of Soda.....	....	15.00	....
Sulphate of Potash.....	....	....	52.00
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00
<i>Blackstone Guano Co., Inc., Blackstone, Va.—</i>			
Blackstone Raw Bone..... Total	20.00	3.70	....
Clover Leaf 16 Per Cent Phosphate.....	16.00	....	....
B. G. Co., Acid Phosphate.....	14.00	....	....
Clover Leaf Grain Fertilizer.....	13.00	1.03	1.00
Dissolved Bone	10.00	1.03	1.00
B. G. Co., Inc., Bone and Potash.....	10.00	....	4.00
B. G. Co., Bone and Potash.....	10.00	....	2.00
Blackstone Special for Tobacco.....	9.00	2.47	3.00
Old Bellefonte	8.00	3.30	2.00
Clover Leaf Brand for Tobacco.....	8.00	2.47	3.00
Tobacco Special	8.00	2.47	3.00
Wrapper Brand	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Jim Crow for Tobacco.....	8.00	2.47	3.00
Bellefonte	8.00	2.47	2.00
Hard Cash for Tobacco.....	8.00	2.06	2.00
Carolina Special for Tobacco.....	8.00	1.65	4.00
Standard Guano	8.00	1.65	2.00
Red Letter for Tobacco.....	8.00	1.65	2.00
Alliance for Tobacco.....	8.00	1.65	2.00
Leader for Tobacco.....	8.00	1.65	2.00

John L. Bailey Co., Elm City, N. C.—

Fairmont Guano	8.00	2.47	3.00
Stag Brand Fertilizer.....	8.00	1.65	2.00

C. J. Burton Guano Co., Baltimore, Md.—

Acid Phosphate	14.00	....	....
Burton's Alkaline	10.00	....	4.00
Burton's Potash Mixture.....	10.00	....	2.00
High Grade Tobacco.....	8.00	3.29	4.00
Burton's Best	8.00	2.47	3.00
Tobacco Queen.....	8.00	2.47	3.00
Burton's High Grade.....	8.00	2.06	3.00
Burton's Butcher Bone.....	8.00	1.65	2.00

Bradley Fertilizer Co., Charleston, S. C.—

High Grade Bradley's Dissolved Phosphate..	16.00	....	....
High Grade Bradley's Acid Phosphate.....	14.00	....	....
Standard Bradley's XXX Acid Phosphate....	13.00	....	....
Standard Bradley's Acid Phosphate.....	12.00	....	....
Standard Bradley's Palmetto Acid Phosphate.	12.00	....	....
H. G. Bradley's Selected Guano.....	10.00	1.65	4.00
High Grade Bradley's Potash Acid Phosphate.	10.00	....	4.00
Standard Bradley's Wheat Grower.....	10.00	....	2.00
Standard Bradley's Bone and Potash.....	10.00	....	2.00
Standard Bradley's Ammoniated Dissolved Bone	9.00	1.85	1.00
Standard Bradley's Patent Superphosphate...	9.00	1.85	1.00
Standard B. D. Sea Fowl Guano.....	9.00	1.85	1.00
Standard Eagle Ammoniated Bone Superphos- phate	9.00	1.85	1.00
High Grade Bradley's Circle Guano.....	8.00	3.29	4.00
High Grade Bradley's Guano.....	8.00	2.46	3.00
Standard Bradley's Cereal Guano.....	8.00	1.65	2.00
Standard Bradley's X Guano.....	8.00	1.65	2.00
German Kainit .....	....	....	12.00

The Bryant Fertilizer Co., Alexandria, Va.—

Bryant's Acid Phosphate.....	17.00	....	....
Bryant's Acid Phosphate.....	16.00	....	....
Bryant's S. C. Dissolved Bone.....	14.00	....	....
Bryant's H. G. Wheat Mixture.....	12.00	....	6.00
Bryant's Bone and Potash.....	10.00	....	4.00
Bryant's Bone and Potash Mixture.....	10.00	....	2.00
Bryant's "Challenge" Highest Grade Tobacco Mixture	9.00	2.46	3.00
Bryant's Special Cotton-seed Meal Fertilizer.	9.00	2.26	2.00
Bryant's Bone Mixture for Tobacco.....	9.00	2.06	2.00
Bryant's H. G. Guano.....	8.00	3.29	4.00
Bryant's H. G. Fertilizer.....	8.00	2.47	3.00
Bryant's "Victor" Tobacco Fertilizer.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Bryant's "Otter" Special Tobacco Fertilizer..	8.00	2.06	3.00
Bryant's Special Fertilizer for Tobacco.....	8.00	2.06	2.00
Bryant's Cotton Grower.....	8.00	1.65	2.00
Bryant's Special Fertilizer.....	8.00	1.65	2.00
Bryant's Cotton-seed Meal Guano.....	8.00	1.65	2.00
Bryant's "Potomac" Bone Special for Tobacco.	8.00	1.65	2.00
Bryant's Wheat Mixture.....	8.00	....	4.00
Bryant's Truck Grower.....	7.00	5.77	7.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Bryant's German Kainit.....	....	....	12.00

The Berkley Chemical Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Resolute Acid Phosphate.....	16.00	....	....
Berkley Acid Phosphate.....	14.00	....	....
Berkley Bone and Potash Mixture.....	11.00	....	2.00
Berkley Plant Food.....	10.00	....	4.00
Laurel Potash Mixture.....	10.00	....	2.00
Monitor Animal Bone Fertilizer.....	9.00	1.85	4.00
Select Crop Grower.....	8.50	2.06	2.50
Victory Special Crop Grower.....	8.00	3.29	4.00
Berkley Tobacco Guano.....	8.00	2.47	3.00
Advance Crop Grower.....	8.00	2.47	3.00
Brandon Superphosphate.....	8.00	1.65	2.00
Long Leaf Tobacco Grower.....	8.00	1.65	2.00
Berkley Peanut and Grain Grower.....	8.00	1.00	4.00
Superior Bone and Potash.....	8.00	....	4.00
Mascot Truck Guano.....	7.00	4.11	5.00
Royal Truck Grower.....	6.00	5.76	5.00
The Leader of the World.....	5.00	3.29	5.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Brague Fertilizer Co., Washington, N. C.—

Palmetto Acid Phosphate.....	14.00	....	....
Long Acre Bone Phosphate.....	14.00	....	....
Farmers' Union Meal Mixture.....	9.00	2.26	2.00
Beaufort County Guano.....	8.00	2.47	3.00
Havana Tobacco Guano.....	8.00	2.47	3.00
Tuckahoe Tobacco Guano.....	8.00	2.06	3.00
Old Reliable Premium Guano.....	8.00	1.65	2.00
Tar Heel Guano.....	8.00	1.65	2.00
Pamlico Trucker.....	7.00	4.12	8.00
Riverview Potato Grower.....	6.00	5.76	5.00
Chocowinity Special Tobacco Guano.....	5.00	3.29	6.00
Sunrise Tobacco Guano.....	4.00	2.47	5.00
Genuine German Kainit.....	....	....	12.00

Conestee Chemical Co., Wilmington, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Conestee High Grade Acid Phosphate.....	14.00	....	....
Conestee Acid Phosphate.....	13.00	....	....
Conestee Bone and Potash.....	11.00	....	6.00
Conestee Bone and Potash.....	11.00	....	5.00
Conestee Bone and Potash.....	11.00	....	4.00
Conestee Bone and Potash.....	11.00	....	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Conestee Bone and Potash.....	11.00	....	2.00
Conestee Bone and Potash.....	10.00	....	6.00
Conestee Bone and Potash.....	10.00	....	5.00
Conestee Bone and Potash.....	10.00	....	4.00
Conestee Bone and Potash.....	10.00	....	3.00
Conestee Bone and Potash.....	10.00	....	2.00
Conestee Cotton Grower.....	9.00	2.27	2.00
Conestee Melon Grower.....	8.00	4.11	7.00
Conestee P. D. Q. Fertilizer.....	8.00	3.30	4.00
Conestee "O.K." Fertilizer.....	8.00	3.30	4.00
Conestee P. D. Q. Fertilizer for Tobacco....	8.00	3.30	4.00
Conestee Plumb Good Fertilizer.....	8.00	2.47	4.00
Conestee Fish Scrap Guano.....	8.00	2.47	3.00
Conestee Special Fertilizer.....	8.00	2.47	3.00
Conestee Special Tobacco Fertilizer.....	8.00	2.47	3.00
Conestee Fertilizer for Tobacco.....	8.00	2.47	2.50
Conestee Fertilizer.....	8.00	2.47	2.50
Conestee Crop Grower.....	8.00	2.06	3.00
Conestee Tobacco Grower.....	8.00	2.06	3.00
Conestee Complete Fertilizer.....	8.00	2.06	2.00
Conestee Special Grain Fertilizer.....	8.00	1.65	2.00
Conestee Standard Guano for Tobacco.....	8.00	1.65	2.00
Conestee Standard Guano.....	8.00	1.65	2.00
Conestee Bone and Potash.....	8.00	....	6.00
Conestee Bone and Potash.....	8.00	....	5.00
Conestee Bone and Potash.....	8.00	....	4.00
Conestee Root Crop Guano.....	7.00	4.11	7.00
Conestee High Grade Guano.....	6.00	4.95	8.00
Conestee Truck Grower.....	6.00	3.30	8.00
Conestee Corn Guano.....	6.00	2.47	3.00
Conestee Special Top Dresser.....	4.00	8.25	4.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.83	....
Conestee Top Dresser.....	....	7.41	3.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
H. G. German Kainit 16 Per Cent.....	....	....	16.00
Genuine German Kainit.....	....	....	12.00

E. W. Browley, Mooresville, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Red.....	10.00	2.47	3.00
Leo.....	8.00	2.47	3.00
16 Per Cent Dried Blood.....	....	13.17	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Columbia Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Raw Bone Meal.....Total	20.25	3.71	....
Columbia High Grade 16 Per Cent Acid Phosphate.....	16.00	....	....
Columbia 14 Per Cent Acid Phosphate.....	14.00	....	....
Columbia Dissolved Bone.....	13.00	....	....
Columbia Acid Phosphate.....	12.00	....	....
Columbia 11 and 5 Bone and Potash Mixture.....	11.00	....	5.00
Columbia 10 and 5 Bone and Potash Mixture.....	10.00	....	5.00
Columbia 10 and 4 Bone and Potash Mixture.....	10.00	....	4.00
Columbia Bone and Potash for Grain.....	10.00	....	3.00
Columbia Bone and Potash Mixture.....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
McRae's Special	9.00	4.12	7.00
Columbia C. S. M. Special.....	9.00	2.27	2.00
Roanoke Ammoniated Guano.....	9.00	1.65	3.00
Carolina Soluble Guano.....	9.00	1.65	1.00
McRae's High Grade Guano.....	8.00	3.30	7.00
Pelican Ammoniated Guano.....	8.00	3.30	4.00
Columbia Special Truck Guano.....	8.60	3.30	4.00
Trojan Tobacco Guano.....	8.00	3.30	4.00
Columbia Special 4-S-3.....	8.00	3.30	3.00
Hayes' Special	8.00	3.30	3.00
Olympia Cotton Guano.....	8.00	2.47	3.00
Hyco Tobacco Guano.....	8.00	2.47	3.00
Our Best Meal Guano.....	8.00	2.47	3.00
Columbia Special Tobacco Guano.....	8.00	2.06	2.00
Royal Tobacco Fertilizer.....	8.00	2.06	3.00
Columbia Special Wheat Fertilizer.....	8.00	1.65	2.00
Columbia Soluble Guano.....	8.00	1.65	2.00
Spinola Peanut Grower.....	8.00	1.02	4.00
Columbia 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Columbia Special 7 Per Cent Truck Guano...	7.00	5.77	7.00
Columbia Potato Guano.....	7.00	4.12	5.00
Crown Brand Peanut Guano.....	7.00	....	5.00
Crew's Special	5.85	4.49	10.00
Columbia Side Dresser.....	4.00	8.22	4.00
Columbia Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Columbia Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Cumberland Bone and Phosphate Co., Portland, Me., and Charleston, S. C.—

Standard Cumberland Bone and Superphosphate of Lime.....	9.00	1.85	1.00
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The Coc-Mortimer Co., Charleston, S. C.—

Thomas Phosphate (Basic Slag).....	19.00
Thomas Phosphate (Basic Slag).....	17.50
Thomas Phosphate (Basic Slag).....	17.00	....	....
Imported Ground Fish Guano, No. 2.....	6.80	9.46	....
Imported Ground Fish Guano, No. 1.....	6.80	8.23	....
High Grade Tankage.....	6.80	8.22	....
High Grade Tankage.....	6.80	7.45	....
Imported Fish Guano.....Total	6.20	5.60	....
High Grade Tankage.....	5.00	8.23	....
High Grade Tankage.....Total	5.00	7.61	....
Imported Fish Guano.....Total	4.48	5.77	....
Imported Fish Guano.....Total	2.00	9.87	....
Nitrate of Soda.....	....	14.76	....
Dried Blood, No. 2.....	....	13.37	....
Nitrate of Potash.....	....	12.30	44.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Cooper Guano Co., Wilmington, N. C.—

Cooper's 16 Per Cent Acid Phosphate.....	16.00	....	....
Cooper's 14 Per Cent Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand	Avail. Phos. Acid.	Nitrogen.	Potash
Cooper's Grain Producer.....	10.00	....	4.00
Cooper's Grain Grower.....	10.00	....	2.00
Cooper's Kite	8.00	4.11	7.00
Cooper's Helmet	8.00	3.29	4.00
Cooper's Horta	8.00	3.29	4.00
Cooper's Chadbourn Truckee	8.00	2.47	10.00
Cooper's Henox	8.00	2.47	3.00
Cooper's Sunset C. S. M.....	8.00	2.47	3.00
Cooper's Clifford	8.00	2.47	3.00
Cooper's Swamp Fox.....	8.00	2.47	2.50
Cooper's Bunker Hill	8.00	2.06	3.00
Cooper's Crusoe	8.00	2.06	2.00
Cooper's Potato	8.00	1.65	10.00
Cooper's Reward	8.00	1.65	2.00
Cooper's Waccamaw	8.00	1.65	2.00
Cooper's Genuine Eagle Island.....	8.00	1.65	2.00
Cooper's Sterling Complete	8.00	1.65	2.00
Cooper's Recorder	8.85	1.65	2.00
Cooper's Peanut Bonnceer.....	8.00	.83	4.00
Cooper's Finis	7.00	4.11	5.00
Nitrate of Soda.....	....	14.82	....
Sulphate Potash .....	....	....	50.00
Muriate of Potash.....	....	....	48.00

Craven Chemical Co., New Bern, N. C.—

Panama 16 Per Cent Acid Phosphate.....	16.00	....	....
Jewel Acid Phosphate.....	14.00	....	....
Trent Bone and Potash.....	10.00	....	2.00
Halifax Guano.....	9.00	2.47	3.00
Prolix 9-2-3 Special Guano.....	9.00	1.65	3.00
Hanover Standard Guano.....	8.00	3.29	4.00
Duplin Tobacco Guano.....	8.00	2.47	3.00
Gaston High Grade Fertilizer.....	8.00	2.47	3.00
C. E. Foy High Grade Guano.....	8.00	2.47	3.00
Marvel Great Crop Grower.....	8.00	2.06	3.00
Elite Cotton Guano.....	8.00	1.65	2.00
Pantego Potato Guano.....	7.00	4.12	7.00
Neuse Truck Grower.....	6.00	4.94	6.00
Craven Chemical Co.'s Truck Guano, 5-10-21½.	5.00	8.24	2.50
Genuine German Kainit.....	....	....	12.00

William H. Camp, Petersburg, Va.—

Bone Meal.....Total	22.50	3.80	....
Camp's Acid Phosphate.....	16.00	....	....
Camp's Acid Phosphate.....	14.00	....	....
Camp's Shepherd Brand Bone and Potash....	10.00	....	4.00
Camp's Bone and Potash.....	10.00	....	2.00
Camp's Yellow Head Chemicals.....	8.00	2.87	7.50
Camp's Lion and Monkey for Tobacco.....	8.00	2.46	3.00
Camp's Red Head Chemicals.....	8.00	2.25	2.00
Camp's Lion and Monkey.....	8.00	1.65	2.00
Camp's Green Head Chemicals, Irish Potato..	7.00	6.15	10.00
Camp's Above All.....	6.00	5.75	5.00
Nitrate of Soda.....	....	14.75	....
German Kainit.....	....	....	12.00

Clayton Oil Mill, Clayton, N. C.—

C. O. M. 16 Per Cent Acid Phosphate.....	16.00	....	....
C. O. M. 14 Per Cent Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
C. O. M. High Grade Bone and Potash.....	12.00	....	5.00
C. O. M. Wheat Compound.....	10.00	2.05	4.50
C. O. M. Special Corn Mixture.....	10.00	....	5.00
C. O. M. Bone and Potash.....	10.00	....	4.00
C. W. H. Special.....	8.00	4.10	5.00
Clayton Guano.....	8.00	2.47	3.00
Clayton Special Tobacco Grower.....	8.00	2.47	3.00
Planters' Favorite.....	8.00	2.47	3.00
Cotton Queen.....	8.00	1.65	2.00
Summer Queen.....	8.00	1.65	2.00
Perfection Top Dresser.....	....	9.85	4.00
C. O. M. German Kainit.....	....	....	12.00

Cowell, Swan & McCotter Co., Bayboro, N. C.—

Bone Phosphate.....	14.00	....	....
Standard Cotton Grower.....	8.00	3.30	3.00
Champion Guano.....	8.00	2.47	3.00
Cowell's Great Tobacco Grower.....	8.00	2.47	3.00
Quick Grower Guano.....	8.00	2.06	3.00
Rust Proof Cotton Guano.....	8.00	1.65	3.00
Crop Guano.....	8.00	1.65	2.00
Great Cabbage and Potato Guano.....	7.00	5.77	7.00
Oriental Trucker.....	7.00	4.12	8.00
Aurora Trucker.....	7.00	4.12	7.00
High Grade Truck Guano.....	7.00	4.12	5.00
Potato Favorite Guano.....	7.00	3.30	7.00
Cabbage Guano.....	5.00	8.25	2.50
German Kainit.....	....	....	12.00

Congaree Fertilizer Co., Columbia, S. C.—

Congaree H. G. Acid Phosphate (3).....	16.00	....	....
Congaree H. G. Acid Phosphate.....	14.00	....	....
Congaree H. G. Acid Phosphate.....	13.00	....	....
Congaree Superphosphate and Potash.....	11.00	....	1.00
Congaree Superphosphate and Potash.....	10.00	....	4.00
Congaree Superphosphate and Potash.....	10.00	....	3.00
Congaree Superphosphate and Potash.....	10.00	....	2.00
Congaree Ammoniated Bone Superphosphate.....	9.00	2.26	2.00
Congaree Prize Winner.....	9.00	1.65	2.00
Congaree Double Ammoniated.....	8.00	6.78	4.00
Congaree Early Trucker.....	8.00	3.30	8.00
Congaree Early Boll.....	8.00	3.30	6.00
Congaree H. G. Fish Guano.....	8.00	3.30	4.00
Congaree Debt Payer.....	8.00	3.30	4.00
Congaree Tobacco Grower.....	8.00	3.30	4.00
Congaree H. G. Fish Guano.....	8.00	2.47	3.00
Congaree Soil Builder.....	8.00	2.47	3.00
Congaree Special Meal Mixture.....	8.00	2.47	3.00
Congaree Tobacco Grower.....	8.00	2.47	3.00
Congaree H. G. Corn Guano.....	8.00	2.47	2.00
Congaree Farmers' Choice.....	8.00	2.06	2.00
North Carolina Standard.....	8.00	1.64	2.00
Congaree Superphosphate and Potash.....	8.00	....	4.00
Truck Farmers' Choice.....	7.00	4.13	7.00
Congaree Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	14.79	....
Congaree Ash Element.....	....	8.23	6.00
Muriate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Chickamauga High Grade Dissolved Bone, No. 16.....	16.00	.....	.....
Chickamauga High Grade Dissolved Bone.....	14.00	.....	.....
Chickamauga 13-4.....	13.00	.....	4.00
Chickamauga Potash Special, No. 4.....	12.00	.....	4.00
Chickamauga Potash Special.....	12.00	.....	2.00
Chickamauga Dissolved Bone.....	12.00	.....	.....
Chickamauga Very Best.....	10.00	3.30	4.00
Ben Hur H. G. Guano.....	10.00	2.47	3.00
Special Potato Compound.....	10.00	1.65	4.00
Special Wheat Compound.....	10.00	1.65	4.00
Special Vegetable Compound.....	10.00	1.65	4.00
Special Corn Compound.....	10.00	1.65	4.00
Chickamauga High Grade Fertilizer.....	10.00	1.65	2.00
Chickamauga High Grade Plant Food.....	10.00	1.65	2.00
Chickamauga Fish Scrap Guano.....	10.00	1.65	2.00
Chickamauga Wheat Special.....	10.00	.82	3.00
Chickamauga Corn Special.....	10.00	.82	3.00
Chickamauga Cotton Special.....	10.00	.82	3.00
Old Glory Mixture.....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower, No. 8.....	10.00	.....	8.00
Chickamauga Wheat and Corn Grower, No. 6.....	10.00	.....	6.00
Chickamauga Wheat and Corn Grower, No. 5.....	10.00	.....	5.00
Chickamauga Wheat and Corn Grower.....	10.00	.....	4.00
Chickamauga Bone and Potash.....	10.00	.....	2.00
Chickamauga Blood, Bone and Tankage Guano.....	9.00	.82	2.00
Special Potato Grower.....	8.00	1.65	6.00
Special Wheat Grower.....	8.00	1.65	6.00
Special Vegetable Grower.....	8.00	1.65	6.00
Special Corn Grower.....	8.00	1.65	6.00
Chickamauga Complete Fertilizer.....	8.00	1.65	2.00
Chickamauga Standard Corn Grower.....	8.00	1.65	2.00
Chickamauga Standard Wheat Grower.....	8.00	1.65	2.00
Georgia Home Guano.....	8.00	1.65	2.00
No. 3 Bone, Tankage and Potash Mixture.....	8.00	.82	3.00
Chickamauga Alkaline Bone, No. 6.....	8.00	.....	6.00
Chickamauga Alkaline Bone, No. 5.....	8.00	.....	5.00
Chickamauga Alkaline Bone.....	8.00	.....	4.00
Nitrate of Soda.....	.....	15.00	.....
Muriate of Potash.....	.....	.....	50.00

Canton Fertilizer Co., Canton, Ga.—

High Grade Acid Phosphate.....	16.00	.....	.....
Acid Phosphate.....	14.00	.....	.....
R. T. Jones Extra H. G.....	10.00	2.47	3.00
Elberta.....	10.00	2.06	7.00
North Georgia High Grade.....	10.00	2.06	3.00
Southern King High Grade.....	10.00	1.65	2.00
Fish Ammoniated High Grade.....	10.00	1.65	2.00
Orange High Grade.....	10.00	1.65	2.00
Jomco High Grade.....	10.00	1.65	2.00
Quickstep Wheat and Grain Grower.....	10.00	.82	3.00
Special Potash Mixture.....	10.00	.....	4.00
Fish Ammoniated Standard.....	8.00	1.65	2.00
Jomco Standard Grade.....	8.00	1.65	2.00
Southern King Standard Grade.....	8.00	1.65	2.00
Dissolved Bone and Potash.....	8.00	.....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Chesapeake Chemical Co., Baltimore, Md.—</i>			
C. C. Co.'s Reliable Phosphate.....	10.00	....	4.00
C. C. Co.'s Celebrated Mixture.....	10.00	....	2.00
C. C. Co.'s Dissolved Phosphate.....	14.00	....	....
C. C. Co.'s High Grade Guano.....	8.00	3.28	4.00
C. C. Co.'s Excelsior Fertilizer.....	8.00	2.46	4.00
C. C. Co.'s Fish Guano.....	8.00	2.46	3.00
C. C. Co.'s Ammoniated Phosphate.....	8.00	1.64	3.00
C. C. Co.'s National Crop Grower.....	8.00	1.64	2.00
C. C. Co.'s Keystone Phosphate.....	7.00	3.28	5.00
C. C. Co.'s Potato Compound.....	6.00	4.10	5.00
C. C. Co.'s Prolific Top Dresser.....	....	7.51	3.50

*Caraleigh Phosphate and Fertilizer Works,
Raleigh, N. C.—*

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....	16.00	....	....
Climax Dissolved Bone.....	14.00	....	....
Sterling Acid Phosphate.....	13.00	....	....
Stable Acid Phosphate.....	12.00	....	....
Horne & Son's High Grade Bone and Potash.	11.00	....	5.00
Special Bone and Potash Mixture.....	10.00	....	4.00
Morris & Scarborough's Special Bone and Potash.	10.00	....	3.00
Electric Bone and Potash Mixture.....	10.00	....	2.00
Pacific Tobacco and Cotton Grower.....	9.00	2.26	2.00
Rhankatte Special Tobacco Guano.....	8.00	3.30	6.00
Special 8-4-4.....	8.00	3.30	4.00
Horne's Best.....	8.00	2.47	3.00
Eclipse Ammoniated Guano.....	8.00	2.47	3.00
Planters' Pride.....	8.00	2.06	3.00
Caraleigh Special Tobacco Guano.....	8.00	2.06	3.00
Eli Ammoniated Fertilizer.....	8.00	1.65	2.00
Crown Ammoniated Guano.....	8.00	1.65	2.00
Comet Guano.....	8.00	.82	3.00
Buncombe Wheat Grower.....	8.00	....	4.00
Caraleigh Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

W. B. Cooper, Wilmington, N. C.—

Nitrate of Soda.....	....	14.82	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00

Contentnea Guano Co., Wilson, N. C.—

High Grade 16 Per Cent Acid.....	16.00	....	....
Contentnea 14 Per Cent Acid.....	14.00	....	....
Special Formula Fertilizer.....	12.00	1.65	4.00
Special Formula.....	10.00	4.10	6.00
Bone and Potash Mixture.....	10.00	....	4.00
8-4½-7 for Tobacco.....	8.00	3.70	7.00
8-4½-7 for Cotton.....	8.00	3.70	7.00
Climax High Grade.....	8.00	3.29	4.00
High Grade Tobacco Grower.....	8.00	2.88	5.00
Victor Fertilizer for Tobacco.....	8.00	2.47	5.00
Tobacco Growers' Special Formula.....	8.00	2.47	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Pick Leaf Tobacco Fertilizer.....	8.00	2.47	3.00
Top Notch	8.00	2.47	3.00
Contentnea Cotton Grower.....	8.00	2.47	2.50
Blood and Bone Cotton Compound.....	8.00	1.65	2.00
Contentnea Corn Special.....	5.00	1.65	5.00
Contentnea Top Dresser.....	3.00	8.23	5.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00
<i>C. P. Dey, Beaufort, N. C.—</i>			
Ground Fish Scrap.....	6.00	9.37	....
<i>J. W. Carter, Marton, N. C.—</i>			
Muriate of Potash.....	....	....	48.00
<i>Cooper Guano Co., Wilmington, N. C.—</i>			
Cooper's Bald Head Island.....	8.00	1.65	2.00
<i>Dixie Guano Co., Savannah, Ga.—</i>			
Phosphoric Acid.....	16.00	....	....
Phosphoric Acid.....	14.00	....	....
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00

Dixie Guano Co., Durham, N. C.—

Dixie 16 Per Cent Acid Phosphate.....	16.00
Dixie 14 Per Cent Acid Phosphate.....	14.00	....	....
Dixie Champion for Wheat and Corn.....	10.50	....	1.50
Jeff Davis Special.....	9.00	2.26	2.00
Dixie Star Ammoniated.....	9.00	1.65	1.00
Dixie Corn Fertilizer.....	9.00	.82	3.00
Radium Brand Guano.....	8.00	3.28	5.00
Dixie Tobacco Fertilizer.....	8.00	2.46	3.00
Carolina Special Ammoniated.....	8.00	2.46	3.00
Sulky Plow Brand Guano.....	8.00	2.46	2.00
Battle's Blood and Bone Fertilizer.....	8.00	2.05	3.00
Niagara Soluble Bone.....	8.00	2.05	2.00
Dixie Cotton Fertilizer.....	8.00	1.65	2.00
Old Plantation Superphosphate.....	8.00	1.65	2.00

Etiwan Fertilizer Co., Charleston, S. C.—

Etiwan 16 Per Cent Acid Phosphate.....	16.00
Etiwan High Grade Acid Phosphate.....	14.00	....	....
Etiwan Dissolved Bone.....	13.00	....	....
Diamond Soluble Bone.....	13.00	....	....
Etiwan Acid Phosphate with Potash.....	11.00	....	1.00
Plow Brand Acid Phosphate with Potash....	11.00	....	1.00
Etiwan Potash Bone.....	10.00	....	4.00
Etiwan Soluble Bone with Potash.....	10.00	....	3.00
Diamond Soluble Bone with Potash.....	10.00	....	2.00
XX Acid Phosphate with Potash.....	10.00	....	2.00
Etiwan Blood and Bone Guano.....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate.....	9.00	2.06	1.00
Etiwan 9-2-3 Per Cent Ammoniated Fertilizer.	9.00	1.65	3.00
Plow Brand Ammoniated Dissolved Bone....	8.85	1.65	2.00
Etiwan Superior Cotton Fertilizer.....	8.00	3.30	6.00
Etiwan Special Cotton Fertilizer.....	8.00	3.30	4.00
Plow Brand Special Tobacco Fertilizer.....	8.00	3.30	4.00
Etiwan Cotton Compound.....	8.00	2.47	3.00
Etiwan High Grade Cotton Fertilizer.....	8.00	2.47	2.00
Etiwan Ammoniated Fertilizer.....	8.00	1.65	2.00
Plow Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Etiwan Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Eastern Cotton Oil Co., Hertford, N. C.—

Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
Currituck Special for Yellow Sweets.....	8.00	3.29	6.00
Mat White Special.....	8.00	3.29	4.00
Rain-proof Cotton Grower.....	8.00	2.47	3.00
Perquimans Favorite.....	8.00	1.65	2.00
Early Bird.....	7.00	4.12	5.00
Hertford Truck Grower.....	6.00	5.77	5.00
Nun-Such Potato Grower.....	6.00	4.12	7.00
Sulphate Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....

Name and Address of Manufacturer and Name of Brand	Avall. Phos. Acid.	Nitrogen.	Potash.
Dried Fish.....	9.07	....
Muriate of Potash.....	48.00
Genuine German Kainit.....	12.00

Elba Manufacturing Co., Marlon, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	..
14 Per Cent Acid Phosphate.....	14.00	....	....
Elba Melon Grower.....	8.00	4.12	7.00
Elba Superior Fertilizer.....	8.00	3.30	4.00
Elba High Grade Fertilizer.....	8.00	3.30	4.00
Elba Gold Seal Fertilizer.....	8.00	2.47	3.00
Elba Champion Fertilizer.....	8.00	2.47	3.00
Elba Uncle Tom Fertilizer.....	8.00	2.47	3.00
Elba Standard Fertilizer.....	8.00	1.65	2.00
Elba Hornet's Nest Fertilizer.....	6.00	5.75	5.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Farmers' Fertilizer Co., Spartanburg, S. C.—

Phosphoric Acid.....	16.00	....	....
Phosphoric Acid.....	14.00	....	....
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Blood and Bone.....	9.00	1.64	3.00
Beats All 9-2-2.....	9.00	1.64	2.00
Standard	8.75	1.64	2.00
Blood, Bone and Potash.....	8.75	1.64	2.00
Farmers' Favorite H. G. Fertilizer.....	8.00	2.47	3.00
Special Corn Fertilizer.....	8.00	1.64	4.00
Standard Grade Fertilizer.....	8.00	1.64	4.00
Standard Grade	8.00	1.64	2.00

Farmers Guano Co., Raleigh, N. C.—

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Farmers' Acid Phosphate.....	13.00	....	....
Special Bone and Potash Mixture.....	10.00	....	4.00
Century Bone and Potash Mixture.....	10.00	....	2.00
Farmers' Blood and Bone.....	8.00	3.29	4.00
Money Point Guano.....	8.00	2.47	3.00
Golden Grade Guano.....	8.00	2.47	3.00
Big Crop Guano.....	8.00	2.06	3.00
Toco Tobacco Guano.....	8.00	2.06	3.00
State Standard Guano.....	8.00	1.65	2.00
Special Bone and Potash.....	8.00	....	4.00
Farmers' Formula.....	7.00	2.47	3.25
Farmers' Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Floradora Guano Co., Laurinburg, N. C.—

Humus	10.00	3.29	5.00
Rocky Ford.....	10.00	2.47	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Floreana	8.00	3.29	4.00
Floradora	8.00	3.29	4.00
Oceola	8.00	2.47	3.00
Rob Roy	8.00	2.47	3.00
Red Raven	8.00	1.65	3.00
Scotland Special	6.40	2.13	3.00

Farmville Oil and Fertilizer Co., Farmville, N. C.—

XXX High Grade Acid Phosphate	18.00	....	....
XX High Grade Acid Phosphate	16.00	....	....
High Grade Acid Phosphate	14.00	....	....
FFF Bone and Potash	12.00	....	4.00
Farmville High Grade (C. S. M.)	10.00	2.47	4.00
Davis's Corn Grower	10.00	.82	5.00
Pitt County Corn Grower	10.00	.82	4.00
Farmville's Favorite Fertilizer	9.00	2.90	5.00
Big Leaf (Tobacco Grower)	9.00	2.88	4.00
Greene County Special (for tobacco)	9.00	2.67	5.00
Willow Green (Cotton Grower)	9.00	2.26	2.00
Scientific Cotton Grower	9.00	2.26	2.00
Specific Cotton Grower	9.00	2.26	2.00
Davis's Special Guano	8.00	3.70	7.00
Pride of Farmville	8.00	3.29	3.00
Uncle Sam's Tobacco Grower	8.00	3.29	3.00
Davis' High Grade Tobacco Manure	8.00	2.47	3.00
Marlboro Tobacco Grower	8.00	2.47	3.00
Golden Crown	8.00	2.47	3.00
Marlboro Cotton Grower (C. S. M.)	8.00	2.47	3.00
Pitt County Cotton Grower	8.00	2.25	4.50
Perfect Tobacco Guano	8.00	2.06	3.00
Davis's Cotton Grower	8.00	1.65	2.00
Carolina Standard	8.00	1.65	2.00
Farmville Standard (C. S. M.)	8.00	1.65	2.00
Farmville's Bone Mixture	8.00	1.65	2.00
Second Application (for cotton)	6.00	4.10	4.00
Evergreen Top Dresser	4.00	8.24	4.00
Sulphate of Ammonia .....	....	20.50	....
Nitrate of Soda .....	....	15.58	....
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00
Genuine German Kainit .....	....	....	12.00

Fremont Oil Mills, Fremont, N. C.—

16 Per Cent Acid Phosphate	16.00	....	....
14 Per Cent Acid Phosphate	14.00	....	....
Fremont High Grade Bone and Potash	10.00	....	4.00
Fremont Oil Mill Co.'s Bone and Potash	10.00	....	2.00
Carolina C. S. M. Compound	9.00	2.26	2.00
Fremont High Grade Guano	8.00	3.29	4.00
Fremont Oil Mill Co.'s Special Tobacco	8.00	2.47	5.00
Fremont Tobacco Guano	8.00	2.47	5.00
Fremont Standard Fertilizer	8.00	2.47	3.00
Wayne County Standard	8.00	2.47	3.00
Nahumta Special	8.00	2.47	3.00
Square Deal	8.00	2.05	3.00
Up-to-date	8.00	1.65	2.00
Home Run	8.00	1.65	2.00
F. O. M. Co. Top Dresser	3.00	7.40	5.00
Nitrate of Soda .....	....	14.85	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Muriate of Potash.....	48.00
Kainit	12.00
Sulphate of Potash.....	48.00

Farmers Cotton Oil Co., Wilson, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Bonum Acid Phosphate.....	14.00	....	....
Contentnea Acid Phosphate.....	13.00	....	....
Washington's Corn Mixture Guano.....	10.00	.82	5.00
Xtra Good Bone and Potash.....	10.00	....	2.00
Dean's Special Guano.....	8.00	3.70	7.00
Regal Tobacco Guano.....	8.00	2.88	5.00
Newsome's Tobacco Special.....	8.00	2.47	4.00
J. D. Farrior's Special Guano.....	8.00	2.47	3.00
Graves' Cotton Grower Guano.....	8.00	2.47	3.00
Golden Gem Guano.....	8.00	2.47	3.00
Wilson High Grade Guano.....	8.00	2.27	2.00
Planters' Friend Guano.....	8.00	2.06	3.00
Carolina Choice Tobacco Guano.....	8.00	2.06	3.00
Crop King Guano.....	8.00	1.65	2.00
Farmers' Special Guano.....	8.00	1.65	2.00
Rogers' Truck Grower.....	7.00	5.76	7.00
Wilson Top Dresser.....	2.00	9.05	4.00
Perfect Top Dresser.....	2.00	8.23	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.63	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

Franklin Cotton Oil and Fertilizer Co., Inc., Franklin, Va.—

Pretlow & Co.'s H. G. Acid Phosphate.....	16.00	....	....
Pretlow & Co.'s H. G. Truck Fertilizer.....	8.00	4.12	5.00
Pretlow & Co.'s Cotton-seed Meal Mixture...	8.00	2.47	3.00
Pretlow & Co.'s Champion Guano	8.00	1.65	2.00
Pretlow & Co.'s Peanut Grower	8.00	1.00	4.00
Pretlow & Co.'s H. G. 7 Per Cent Guano....	7.00	5.76	7.00
Pretlow & Co.'s Genuine German Kainit.....	....	....	12.00

Germofert Manufacturing Co., Charleston, S. C.—

Grain Fertilizer	5.00	.82	6.00
Fruit and Flower Fertilizer.....	2.00	3.29	6.00

German Kali Works, Baltimore, Md.—

Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Home Fertilizer and Chemical Co., Baltimore, Md.—

Champion Dissolved Phosphate.....	16.00	....	....
Boykin's High Grade Acid Phosphate.....	14.00	....	....
Boykin's Dissolved Animal Bone.....	12.00	1.65	....
Gilt Edge Crop Grower.....	10.00	1.65	4.00
Home Bone and Potash.....	10.00	....	5.00
Boykin's Alkaline Bone.....	10.00	....	2.00
Home Ammoniated Bone.....	9.00	1.65	3.00
Home B. G. Ammoniated Compound.....	9.00	.82	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Everybody's Fertilizer	9.00	.82	2.00
Home Standard Guano.....	8.00	3.29	4.00
Riosa Tobacco Compound.....	8.00	2.48	3.00
Special C. & C. Compound.....	8.00	2.48	3.00
Yancey's Formula for Yellow Leaf Tobacco..	8.00	2.48	2.00
Phoenix Crop Grower.....	8.00	2.48	2.00
Home Potato Special.....	8.00	1.65	10.00
Matchless Guano	8.00	1.65	4.00
Boykin's Cereal Fertilizer.....	8.00	1.65	2.00
Ammoniated Bone Manure.....	7.00	1.65	5.00
Farmers' Choice	7.00	.82	4.00
Truckers' Special Compound.....	6.00	5.77	5.00
Boykin's Vegetable Fertilizer.....	6.00	4.12	6.00
Boykin's Home Potato Grower.....	6.00	3.30	4.00
Cerealite Top Dresser.....	....	7.43	3.00
Home Fertilizer .....	....	5.77	7.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

Hadley, Harris & Co., Wilson, N. C.—

Hadley's Special 8-4½-7 Mixture.....	8.00	3.70	7.00
Hadley's Tobacco and Cotton Special.....	8.00	2.47	5.00
Golden Weed Tobacco Grower.....	8.00	2.47	3.00
Hadley Boss Guano.....	8.00	2.26	2.50
Daisy Fish Mixture.....	8.00	1.65	2.00
Top Dressing	2.00	8.23	5.00
Nitrate of Soda.....	....	15.60	....
German Kainit .....	....	....	12.00

Hampton Guano Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Supreme Acid Phosphate.....	16.00	....	....
Hampton Acid Phosphate.....	14.00	....	....
Hampton Bone and Potash Mixture.....	11.00	....	2.00
Hampton Crop Grower.....	10.00	....	4.00
Dauntless Potash Mixture.....	10.00	....	2.00
Arlington Animal Bone Fertilizer.....	9.00	1.85	4.00
Alpha Crop Grower.....	8.50	2.06	2.50
Little's Favorite Crop Grower.....	8.00	3.29	4.00
Hampton Tobacco Guano.....	8.00	2.47	3.00
P. P. P. (Princess Prolific Producer).....	8.00	2.47	3.00
Extra Tobacco Guano	8.00	1.65	2.00
Shirley Super Phosphate.....	8.00	1.65	2.00
Hampton Special Grain and Peanut Fertilizer.	8.00	1.00	4.00
Excelsior Bone and Potash.....	8.00	....	4.00
Reliance Truck Guano.....	7.00	4.11	5.00
Virginia Truck Grower.....	6.00	5.76	5.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

S. B. Harrell & Co., Inc., Norfolk, Va.—

Harrell's Acid Phosphate	14.00	....	....
Harrell's Eclipse	9.00	2.26	2.00
Harrell's Champion Cotton and Peanut Grower	8.00	1.65	2.00
Harrell's Truck Guano.....	6.00	5.76	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>M. P. Hubbard & Co., Baltimore, Md.—</i>			
Hubbard's Soluble S. C. Phosphate.....	16.00	...	....
Hubbard's Havana Special for Tobacco.....	8.00	2.48	3.00
Hubbard's Celebrated Phosphate.....	8.00	1.65	2.00
Hubbard's Maryland Special Vegetable Grower.	7.00	4.13	5.00
Hubbard's Special Cotton and Corn Fertilizer.	7.00	1.65	5.00
Hubbard's 7 Per Cent Bermuda Guano.....	6.00	5.78	5.00
Nitrate of Soda.....	....	15.60	....
Ground Fish.....	....	8.25	....
Muriate of Potash.....	....	....	50.00

The Hubbard Fertilizer Co., Baltimore, Md.—

Hubbard's 14 Per Cent Phosphate.....	14.00	....	....
Hubbard's Special Mixture 10 and 4.....	10.00	....	4.00
Hubbard's B. and P. 10 and 2.....	10.00	....	2.00
Hubbard's Noxall.....	8.00	3.28	4.00
Hubbard's Royal Ensign.....	8.00	2.46	4.00
Hubbard's Yellow Wrapper.....	8.00	2.46	3.00
Hubbard's Fish Compound.....	8.00	1.64	3.00
Hubbard's Exchange Guano.....	8.00	1.64	2.00
Hubbard's Southern Leader.....	7.00	3.28	5.00
Hubbard's 5 Per Cent Royal Seal.....	6.00	4.10	5.00
Hubbard's Heavy Long Leaf.....	4.00	3.28	6.00
Hubbard's New Process Top Dresser.....	7.51	3.50
Pure German Kainit.....	12.00

L. Harvey & Son Co., Kinston, N. C.—

Nitrate of Soda.....	15.00
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Harby & Co., Sumter, S. C.—

Nitrate of Soda.....	14.85
Muriate of Potash.....	49.00
German Kainit.....	12.00

Interstate Chemical Co., Charleston, S. C.—

Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
Acid Phosphate.....	13.00	....	....
Acid Phosphate with Potash.....	11.00	....	1.00
Acid Phosphate with Potash.....	10.00	....	4.00
Acid Phosphate with Potash.....	10.00	....	2.00
Complete Fertilizer.....	9.00	2.06	2.00
Favorite Crop Grower.....	9.00	1.65	2.00
H. G. Ammoniated Fertilizer.....	8.00	3.30	4.00
Planters' Preference Guano.....	8.00	2.49	3.00
Challenge Brand Guano.....	8.00	2.06	2.00
Ammoniated Guano.....	8.00	1.64	2.00
Acid Phosphate with Potash.....	8.00	....	4.00
Special High Grade Formula.....	7.00	2.47	7.00
Nitrate of Soda.....	....	18.00	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
German Kainit.....	....	....	12.00

The Imperial Co., Norfolk, Va.—

Imperial H. G. Tennessee Acid Phosphate....	16.00	....	....
Imperial High Grade Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Imperial Catawba Wheat Grower.....	10.00	....	4.00
Imperial Carolina Wheat Mixture.....	10.00	....	3.00
Imperial Virginia Grain Mixture.....	10.00	....	2.00
Imperial Bone and Potash.....	10.00	....	2.00
Imperial Martin County Special Crop Grower.	9.00	2.26	2.00
Imperial Snowflake Cotton Grower.....	8.00	3.29	4.00
Imperial Tobacco Grower.....	8.00	3.29	4.00
Imperial N. L. O. Cotton Guano.....	8.00	2.47	3.00
Imperial Tobacco Guano.....	8.00	2.47	3.00
Imperial Yellow Bark Sweet Potato Guano..	8.00	2.47	3.00
Imperial F. and B. Cotton Guano.....	8.00	2.06	3.00
Imperial Bright Tobacco Guano.....	8.00	2.06	3.00
Imperial Tennessee Tobacco Guano.....	8.00	1.65	8.00
Imperial Peanut Guano.....	8.00	1.65	4.00
Imperial Cotton Grower.....	8.00	1.65	2.00
Imperial Peanut and Corn Guano.....	8.00	1.65	2.00
Imperial Champion Guano.....	8.00	1.65	2.00
Imperial Cisco Soluble Guano.....	8.00	1.65	2.00
Imperial Standard Premium.....	8.00	1.65	2.00
Imperial Fish and Bone Grain Grower.....	8.00	.82	4.00
Imperial Yadkin Wheat Grower.....	8.00	....	4.00
Imperial 7-7-7 Potato Guano.....	7.00	5.76	7.00
Imperial High Grade Irish Potato Guano....	7.00	4.11	8.00
Imperial Dawson's Cotton Grower.....	7.00	2.67	2.75
Imperial Roanoke Crop Grower.....	7.00	2.47	2.00
Imperial Asparagus Mixture.....	6.00	4.94	7.00
Imperial 5-6-7 Potato Guano.....	6.00	4.11	7.00
Imperial Williams' Special Potato Guano....	6.00	4.11	5.00
Imperial Fish and Bone.....	6.00	3.29	4.00
Imperial Sweet Potato Guano.....	6.00	1.65	6.00
Imperial 10 Per Cent Guano.....	5.00	8.23	2.50
Imperial Special 7 Per Cent for Potatoes....	5.00	5.76	5.00
Imperial Special Tobacco Guano.....	5.00	3.29	9.00
Imperial Laughinghouse Special Tobacco Guano.....	4.00	3.29	6.00
Imperial Conetoe Cotton Grower.....	4.00	3.29	4.00
Imperial Cubanola Tobacco Guano.....	4.00	2.47	5.00
Imperial Top Dresser for Cotton.....	2.00	8.23	....
Imperial Nitrate of Soda.....	....	15.00	....
Imperial Muriate of Potash.....	....	....	49.00
Imperial Genuine German Kainit.....	....	....	12.00

J. T. John, John's Station, N. C.—

Muriate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

V. B. Josey Guano Co., Tarboro, N. C.—

Josey's 16 Per Cent Acid Phosphate.....	16.00	....	....
Josey's 14 Per Cent Acid Phosphate.....	14.00	....	....
Josey's Bone and Potash.....	10.00	....	4.00
Josey's Truck Guano.....	8.00	4.10	5.00
Josey's 8-4-4 C. S. Meal and Fish Scrap Guano.....	8.00	3.30	4.00
Josey's Best C. S. Meal and Fish Scrap Guano	8.00	2.47	3.00
Josey's Tip Top C. S. Meal and Fish Scrap Tobacco Guano.....	8.00	2.47	3.00
Josey's Favorite C. S. Meal and Fish Scrap Guano.....	8.00	2.05	2.50
Josey's C. S. Meal Guano.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Josey's Peanut Guano	5.50	1.23	5.50
Nitrate of Soda.....	15.50	....
Josey's XX Top Dresser.....	7.40	4.00
Sulphate of Potash.....	50.00
Muriate of Potash.....	48.00
Genuine German Kainit.....	12.00

Lister's Agricultural Chemical Works, Newark, N. J.—

Lister's Standard Pure Bone Superphosphate of Lime	9.00	1.65	2.00
Lister's Ammoniated Dissolved Bone Phos- phate	8.00	2.06	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00

A. S. Lee & Sons Co. (Inc.), Richmond, Va.—

Thomas' Basic Slag.....Total	15.00	....	....
Lee's Corn Fertilizer	10.00	....	2.00
Lee's Wheat Fertilizer.....	10.00	....	2.00
Lee's Bone and Potash.....	9.00	....	4.00
Lee's Natural Tobacco Grower.....	8.00	1.65	2.00

Lumberton Cotton Oil and Ginning Co.,

Lumberton, N. C.—

Acid Phosphate.....	16.00	....	....
Gold Dollar.....	8.00	3.30	4.00
Silver Dollar	8.00	2.47	3.00
Genuine German Kainit.....	....	....	12.00

John F. McNair, Laurinburg, N. C.—

Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

E. H. & J. A. Meadows Co., New Bern, N. C.—

Diamond Acid Phosphate	16.00	....	....
Meadows' Diamond Acid Phosphate.....	14.00	....	....
Meadows' Dissolved Bone and Potash Com- pound	10.00	....	2.00
Meadows' Lobos Guano	8.00	4.11	5.00
Meadows' Ideal Tobacco Guano.....	8.00	3.29	4.00
Brooks' Special Tobacco Grower.....	8.00	2.47	5.00
Parker's Special Tobacco Guano.....	8.00	2.47	4.00
Dixon's High Grade Tobacco Guano.....	8.00	2.47	3.00
Meadows' Gold Leaf Tobacco Guano.....	8.00	2.47	3.00
Meadows' Roanoke Guano	8.00	2.05	3.00
Meadows' All Crop Guano.....	8.00	2.05	2.50
Meadows' Cotton Guano.....	8.00	1.64	2.00
Hookerton Cotton Guano.....	8.00	1.64	2.00
Meadows' Great Cabbage Guano.....	7.00	5.76	7.00
Meadows' Great Potato Guano.....	7.00	4.11	8.00
Meadows' 10 Per Cent Guano.....	6.00	8.23	2.50
Meadows' German Kainit.....	....	....	12.00

The Miller Fertilizer Co., Baltimore, Md.—

Miller's 16 Per Cent Acid Phosphate.....	16.00	....	....
Miller's 14 Per Cent Acid Phosphate.....	14.00	....	....
Corn and Peanut Grower.....	10.50	....	2.25
Corn and Wheat Grower.....	10.50	....	2.25

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
The Miller Fertilizer Co.'s 10 and 4 Per Cent.	10.00	....	4.00
Clinch	10.00	....	2.00
Trucker	8.00	4.12	5.00
No. 1 Potato and Vegetable Grower.....	8.00	3.71	7.00
Miller's Irish Potato.....	8.00	3.29	4.00
4 Per Cent Tobacco.....	8.00	3.29	4.00
Miller's S-3-6	8.00	2.47	6.00
Standard Phosphate.....	8.00	2.47	3.00
Tobacco King	8.00	2.47	3.00
Harmony	8.00	2.06	3.00
Special Tobacco Grower.....	8.00	1.65	4.00
Potato and Vegetable Guano.....	8.00	1.65	4.00
Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Farmers' Profit	8.00	1.65	2.00
High Grade Potato.....	6.00	4.12	7.00
Nitrate of Soda.....	....	15.05	....
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

*The Mapes Formula and Peruvian Guano Co.,
143 Liberty Street, New York—*

Mapes' Complete Manure, "A" Brand.....	10.00	2.47	2.50
Mapes' Corn Manure.....	8.00	2.47	6.00
Mapes' Vegetable or Complete Manure for Light Soils	6.00	4.94	6.00
Mapes' Economical Potato Manure.....	4.00	3.29	8.00

T. W. Newborn & Co., Kinston, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Genuine German Kainit.....	....	....	12.00

D. B. Martin Co., Richmond, Va.—

Pure Ground Bone.....Total	22.00	2.46	....
Raw Bone Meal.....Total	21.00	3.70	....
Animal Bone Potash Compound.....	16.00	1.65	2.50
Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Pure Dissolved Animal Bone.....	12.00	1.64	....
Potash and Soluble Bone.....	12.00	....	5.00
Potash and Soluble Bone.....	12.00	....	3.00
Potash and Soluble Bone.....	10.00	....	6.00
Potash and Soluble Bone.....	10.00	....	5.00
Potash and Soluble Bone.....	10.00	....	4.00
Potash and Soluble Bone.....	10.00	....	2.00
Martin's Tobacco Compound.....	9.00	2.26	2.00
Dissolved Organic Compound.....	9.00	1.00	3.00
Martin's High Grade Guano.....	8.75	1.65	2.00
Martin's Cotton Guano.....	8.00	3.28	4.00
Martin's Red Star Brand.....	8.00	3.28	4.00
Martin's Blue Ribbon Brand Fertilizer.....	8.00	3.28	2.00
Martin's Tobacco Special.....	8.00	2.52	3.00
Martin's Bull Head Fertilizer.....	8.00	2.46	3.00
Martin's Special Fertilizer, S-2½-3.....	8.00	2.26	3.00
Martin's Cotton Guano.....	8.00	2.05	1.00
Martin's Animal Organic Compound.....	8.00	1.65	3.00
Martin's Slaughter House Special.....	8.00	1.65	2.00
Martin's Wheat Special.....	8.00	1.65	2.00
Martin's Carolina Special for Tobacco.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Martin's Carolina Cotton.....	8.00	1.65	2.00
Corn and Cereal Special.....	8.00	1.65	2.00
Old Virginia Favorite.....	8.00	1.65	2.00
Martin's Special Potato Manure.....	8.00	1.00	5.00
One-Eight-Four	8.00	1.00	4.00
Martin's Peanut Grower.....	8.00	1.00	4.00
Martin's Top Dresser.....	7.00	8.22	2.50
Martin's Gilt Edge Potato Manure.....	7.00	2.46	10.00
Martin's Claremont Vegetable Grower.....	7.00	2.46	5.00
Martin's 7 Per Cent Guano.....	6.00	5.74	5.00
Martin's Animal Bone Potato Guano.....	6.00	4.10	7.00
Martin's Early Truck and Vegetable Grower..	6.00	3.28	8.00
Martin's Top Dresser.....	5.00	8.22	2.50
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Marietta Fertilizer Co., Atlanta, Ga.—

Marietta XXXX High Grade Acid Phosphate.	16.00
Marietta High Grade Acid Phosphate.....	14.00	....	....
Langford's Special	10.00	1.65	4.00
Cooper's High Grade Guano.....	10.00	1.65	2.00
Fish Compound	10.00	1.65	2.00
Royal Seal Guano.....	10.00	1.65	2.00
Tonawando Guano	10.00	1.65	2.00
Marietta Potash Special	10.00	....	4.00
Dissolved Bone Potash.....	10.00	....	2.00
Marietta Cotton Grower.....	9.00	2.47	3.00
Marietta Boll Producer.....	9.00	1.65	3.00
Marietta Fertilizer, No. 844.....	8.00	3.30	4.00
Marietta Tobacco Special.....	8.00	2.47	3.00
Marietta Fertilizer, No. 833.....	8.00	2.47	3.00
Marietta Fertilizer, No. 836.....	8.00	2.47	6.00
Marietta Best for Tobacco.....	8.00	2.06	3.00
Marietta Sweet Potato Special.....	8.00	2.06	3.00
Marietta Special Potato.....	8.00	1.65	10.00
Marietta Fruit and Root Special.....	8.00	1.65	5.00
Marietta Fertilizer, No. 823.....	8.00	1.65	3.00
Marietta Guano	8.00	1.65	2.00
Marietta Manure Substitute.....	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

Marsh-Lee & Co., Marshville, N. C.—

Marsh's Acid.....	16.00
Marsh's Acid.....	14.00	....	....
Marsh's Special High Grade.....	8.00	2.47	3.00
Marsh's Cotton Fertilizer.....	8.00	1.65	2.00
Marsh's Guano for Corn.....	8.00	1.65	2.00

The MacMurphy Co., Charleston, S. C.—

High Grade Acid Phosphate, 14 Per Cent....	14.00	....	....
Acid Phosphate	13.00	....	....
Acid Phosphate and Potash.....	10.00	....	5.00
Acid Phosphate and Potash.....	10.00	....	4.00
Acid Phosphate and Potash.....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Wileox & Gibbs Co.'s Manipulated Guano.....	9.00	2.26	2.00
Special Cotton and Corn 8.75-2-3.....	8.75	1.65	2.00
Special 8-4-6 Guano.....	8.00	3.29	6.00
Special 8-4-4 Cotton Guano.....	8.00	3.29	4.00
Special 8-4-4 Tobacco Guano.....	8.00	3.29	4.00
Special 8-3-3 Cotton and Corn.....	8.00	2.47	3.00
Special 8-3-3 Tobacco Guano.....	8.00	2.47	3.00
Standard 8-2½-1 Guano.....	8.00	2.06	1.00
Special 8-2-2 Guano.....	8.00	1.65	2.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Pure German Kainit.....	....	....	12.00

Marlboro Fertilizer Co., Bennettsville, S. C.—

Marlboro Perfection Acid Phosphate.....	16.00
Marlboro High Grade Acid Phosphate.....	14.00	....	....
Marlboro Standard Acid Phosphate.....	13.00	....	....
Marlboro Perfection 8-4-4.....	8.00	4.00	4.00
Marlboro Special 8-4-4.....	8.00	4.00	4.00
Marlboro High Grade 8-3-3.....	8.00	3.00	3.00
Marlboro Excelsior 8-3-3.....	8.00	3.00	3.00
Marlboro Complete Fertilizer.....	7.00	3.00	12.00
Marlboro Fertilizer Co.'s Special Top Dresser.....	4.00	10.00	3.00
Marlboro County Top Dresser.....	....	9.00	3.00
Marlboro German Kainit.....	....	....	12.00

Martin & White Co., Norfolk, Richmond and Baltimore—

Phosphate and Potash.....	12.00	....	5.00
Phosphate and Potash.....	12.00	....	3.00
Phosphate and Potash.....	10.00	....	5.00
Phosphate and Potash.....	10.00	....	4.00
Phosphate and Potash.....	10.00	....	2.00
H. G. Cotton and Tobacco Guano.....	8.00	3.28	4.00
Organic Cotton Grower.....	8.00	2.46	3.00
Special Peanut Grower.....	8.00	1.05	4.00
Fish Guano.....	8.00	1.65	3.00
Fruit Special.....	8.00	1.65	2.00
Big Crop Grower.....	8.00	1.65	2.00
Blood, Bone and Potash.....	7.00	4.10	8.00
Special Seven Per Cent Trucker.....	6.00	5.74	5.00
Special Potato Grower.....	6.00	4.10	7.00
Virginia Trucker.....	6.00	3.38	4.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Kainit.....	....	....	12.00

North Carolina Cotton Oil Co., Wilmington, N. C.—

Wilmington Mortgage Lifter.....	9.00	2.27	2.00
Wilmington Prolific Crop Grower.....	9.00	2.27	2.00
Wilmington's Pride.....	8.00	4.12	7.00
Wilmington Truck Grower.....	8.00	3.30	4.00
Bullock's High Grade.....	8.00	3.29	4.00
Wilmington Full Value.....	8.00	3.29	4.00
John's Special.....	8.00	2.47	4.00
Bullock's Cotton Grower.....	8.00	2.47	4.00
Wilmington Leader.....	8.00	2.47	3.00
Wilmington Farmer Boy.....	8.00	2.47	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Wilmington High Grade.....	8.00	2.47	3.00
L. P. B. Special.....	8.00	2.47	3.00
Lewis' Special	8.00	2.47	3.00
Carter's Lifter	8.00	2.47	3.00
Wilmington Standard	8.00	2.47	2.50
Pate's Special	8.00	2.47	2.00
Currie's Crop Grower.....	8.00	2.06	4.00
Wilmington Tobacco Grower.....	8.00	2.06	3.00
Wilmington Banner	8.00	1.65	3.00
Clark's Special	8.00	1.65	3.00
Wilmington Cotton Grower.....	8.00	1.65	2.00
Wilmington Special	8.00	1.65	2.00
Wilmington Headlight	6.00	3.29	8.00
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	50.00
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8.00	2.26	2.00
<i>North Carolina Cotton Oil Co., Henderson, N. C.—</i>			
Two and One.....	10.00	3.28	4.00
Henderson Tobacco Fertilizer.....	9.00	2.47	3.00
Franklin Tobacco Fertilizer.....	9.00	2.47	3.00
Pride of Vance Tobacco Fertilizer.....	9.00	2.47	3.00
Uneedit Tobacco Fertilizer.....	9.00	2.47	3.00
Two in One.....	8.00	3.29	4.00
McKinne Mixture	8.00	2.26	3.25
Brewer's Special	8.00	2.26	2.00
Henderson Cotton Grower.....	8.00	1.65	2.00
Franklin Cotton Grower.....	8.00	1.65	2.00
Uneedit Cotton Grower.....	8.00	1.65	2.00
Vance Cotton Grower.....	8.00	1.65	2.00
<i>Nitrate Agencies Co., New York, Baltimore, Savannah, Charleston and Norfolk—</i>			
Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Nitrate of Soda, 95 Per Cent.....	....	15.65	....
Nitrate of Soda.....	....	15.50	....
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Special Corn and Peanut Grower.....	11.00	....	2.00
High Grade Bone and Potash.....	10.00	....	4.00
Carteret Bone and Potash.....	10.00	....	2.00
Oriole Tobacco Grower.....	8.00	3.30	4.00
Foy's High Grade Fertilizer.....	8.00	2.47	3.00
Lenoir Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Pitt's Prolific Golden Tobacco Guano.....	8.00	2.47	3.00
Favorite Cotton Grower.....	8.00	2.27	2.00
Onslow Farmers' Reliance Guano.....	8.00	2.06	3.00
Jones County Premium Crop Grower.....	8.00	2.06	3.00
Craven Cotton Guano.....	8.00	1.65	2.00
Greene County Standard Fertilizer.....	8.00	1.65	2.00
Dunn's Standard Truck Grower.....	7.00	5.77	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Ives' Irish Potato Guano.....	7.00	4.12	7.00
Eureka Tobacco Fertilizer.....	6.00	3.30	7.00
Pamlico Electric Top Dresser.....	5.00	8.25	2.50
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	15.67	....
High Grade Fish Scrap.....	....	8.25	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Norfolk Fertilizer Co., Norfolk, Va.—

Oriana 16 Per Cent Acid Phosphate.....	16.00	....	....
Whitney High Grade Acid Phosphate.....	16.00	....	....
Oriana 14 Per Cent Acid Phosphate.....	14.00	....	....
Oriana Wheat Grower.....	10.00	....	4.00
Shenandoah Wheat Mixture.....	10.00	....	3.00
Young's Grain Grower.....	10.00	....	2.00
Oriana Bone and Potash.....	10.00	....	2.00
Oriana C. S. M. Special.....	9.00	2.26	2.00
Oriana First Step Tobacco Guano.....	8.00	3.29	4.00
Oriana Tobacco Guano.....	8.00	2.47	3.00
Oriana for Cotton.....	8.00	2.47	3.00
Oriana Cotton Guano.....	8.00	1.65	2.00
Oriana Crop Grower.....	8.00	1.65	2.00
Mayodan Valley Wheat Grower.....	8.00	....	4.00
Pine Top Special Crop Grower.....	5.00	1.65	6.00
H. G. Tobacco Guano.....	4.00	3.29	6.00
Nitrate of Soda Mixture for Top Dressing Cotton	2.00	8.23	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Navassa Guano Co., Wilmington, N. C.—

Navassa Acid Phosphate.....	17.00
Navassa Acid Phosphate.....	16.00	....	....
Navassa 14 Per Cent Acid Phosphate.....	14.00	....	....
Navassa Dissolved Bone.....	13.00	....	....
Navassa Special Wheat Mixture.....	12.00	....	4.00
Navassa Gray Land Mixture.....	12.00	....	4.00
Navassa Acid Phosphate.....	12.00	....	....
Maxim Guano	10.00	2.47	2.00
Corona Guano	10.00	1.65	2.00
Navassa Wheat and Grass Grower.....	10.00	....	4.00
Navassa Wheat Mixture.....	10.00	....	2.25
Navassa Dissolved Bone with Potash.....	10.00	....	2.00
Navassa Fish Guano.....	9.00	2.47	3.00
Navassa Manipulated Guano.....	9.00	2.26	2.00
Osceola Guano	9.00	1.65	3.00
Harvest Queen Fertilizer.....	9.00	1.65	2.00
Navassa Complete Fertilizer.....	9.00	1.65	1.00
Farmers' Special Mixture.....	8.75	2.25	4.00
Navassa Universal Fertilizer.....	8.50	2.06	1.00
Navassa Special Truck Guano.....	8.00	3.29	4.00
Coree Tobacco Guano.....	8.00	3.29	4.00
Navassa Carib Guano.....	8.00	2.47	10.00
Navassa Blood and Meal Mixture.....	8.00	2.47	5.00
Orton Guano	8.00	2.47	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Navassa High Grade Guano.....	8.00	2.47	3.00
Clarendon Tobacco Guano.....	8.00	2.47	3.00
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8.00	2.47	2.00
Navassa Strawberry Top Dressing.....	8.00	2.06	4.00
Mogul Guano	8.00	2.06	3.00
Navassa Guano for Tobacco.....	8.00	2.06	2.00
Ammoniated Soluble Navassa Guano.....	8.00	2.06	2.00
Brooks' Ammoniated Guano.....	8.00	2.06	1.50
Navassa Fruit Grower Fertilizer.....	8.00	1.65	6.00
Harvest King Guano.....	8.00	1.65	3.00
Clark's Special Cotton-seed Meal Guano.....	8.00	1.65	3.00
Navassa Grain Fertilizer.....	8.00	1.65	2.00
Navassa Cotton-seed Meal Guano.....	8.00	1.65	2.00
Navassa Cotton Fertilizer.....	8.00	1.65	2.00
Occoneechee Tobacco Guano.....	8.00	1.65	2.00
Navassa Dissolved Bone with Potash.....	8.00	....	4.00
Navassa Lettuce Grower Fertilizer.....	7.00	7.00	7.00
Navassa Root Crop Fertilizer.....	7.00	4.12	7.00
Navassa Creole Guano.....	6.00	4.12	7.00
Navassa H. G. Top Dresser.....	4.00	7.82	4.00
Navassa Top Dresser.....	4.00	6.17	2.50
Sulphate of Ammonia.....	....	20.59	....
Nitrate of Soda.....	....	14.82	....
Blood .....	....	13.15	....
Fish Scrap .....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

G. Ober & Sons Co., Baltimore, Md.—

Pure Raw Bone Meal.....Total	21.00	3.71	....
Ober's High Grade Acid Phosphate.....	16.00	....	....
Ober's Dissolved Bone Phosphate.....	14.00	....	....
Ober's Standard Potash Compound.....	12.00	....	5.00
Ober's Dissolved Animal Bone.....	10.00	2.47	....
Ober's Dissolved Bone, Phosphate and Potash.....	10.00	....	2.00
Ober's Special Ammoniated Dissolved Bone...	9.00	1.65	2.00
Ober's Farmers' Mixture.....	9.00	.82	2.00
Ober's H. G. Fertilizer.....	8.00	3.30	4.00
Ober's Special Compound for Tobacco.....	8.00	2.47	3.00
Ober's Standard Tobacco Fertilizer.....	8.00	1.65	2.00
Ober's Special Cotton Compound.....	8.00	1.65	2.00
Ober's Soluble Ammoniated Superphosphate of Lime	8.00	1.65	2.00
Ober's Stag Guano.....	8.00	.82	4.00
Ober's Acid Phosphate with Potash.....	8.00	....	4.00
Ober's Complete Fertilizer.....	6.00	4.12	6.00
Ober's Special Potash Compound for Tobacco.....	6.00	2.47	7.00
Ober's Special Tobacco Bed Fertilizer, 10 Per Cent	4.00	8.25	3.00
Nitrate of Soda.....	....	15.50	....
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

The Pocomoke Guano Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Superb Acid Phosphate.....	16.00	....	....
Peerless Acid Phosphate.....	14.00	....	....
Alkali Bone	11.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Pocomoke Bone and Potash Mixture.....	10.00	....	4.00
10-2 Potash Mixture.....	10.00	....	2.00
Monticello Animal Bone Fertilizer.....	9.00	1.85	4.00
Cinco Tobacco Guano.....	8.50	2.06	2.50
Pocomoke Superphosphate	8.50	1.65	2.00
Electric Crop Grower.....	8.50	1.65	2.00
Garrett's Grape Grower.....	8.00	3.29	10.00
Faultless Ammoniated Superphosphate.....	8.00	3.29	4.00
Harvey's High Grade Monarch.....	8.00	2.47	3.00
Monarch Tobacco Grower.....	8.00	2.47	3.00
C. C. C. (Crescent Complete Compound).....	8.00	1.65	3.00
Pamlico Superphosphate	8.00	1.65	2.00
Pocomoke Wheat, Corn and Peanut Manure..	8.00	1.00	4.00
Pocomoke Defiance Bone and Potash.....	8.00	....	4.00
Standard Truck Guano.....	7.00	4.11	5.00
Freeman's 7 Per Cent Irish Potato Grower...	6.00	5.76	5.00
Seaboard Popular Trucker.....	6.00	5.76	5.00
Coast Line Truck Guano.....	5.00	8.23	3.00
Smith's Special Formula.....	4.00	3.29	6.00
Nitrate of Soda.....	....	15.00	....
Ground Fish .....	....	8.23	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Peruvian Guano Corporation, Charleston, S. C.—

Peruvian Guano Ex. S. S. Caithness-shire....	18.00	3.08	2.40
Acid Phosphate	16.00	....	....
Peruvian Guano Ex. S. S. Chipana.....	14.00	3.29	2.00
Peruvian Guano Ex. S. S. Condor.....	14.00	2.46	2.00
Peruvian Guano Ex. S. S. Belle of Scotland..	14.00	2.14	1.70
Acid Phosphate	14.00	....	....
Peruvian Guano Ex. S. S. Capac.....	13.00	4.93	2.00
Acid Phosphate	13.00	....	....
Peruvian Guano Ex. S. S. Chipana "Lobos Isl".	12.00	2.88	2.00
Peruvian Guano Ex. S. S. Chipana "Bellestas".	11.00	6.78	2.75
Peruvian Guano Ex. S. S. Chipana Smith Isl..	11.00	5.76	2.00
Peruvian Guano Ex. S. S. Belle of Scotland...	10.00	4.11	2.00
"Chincha Island" High Grade Peruvian Mix- ture	10.00	3.29	4.00
"Penguin" Peruvian Compound.....	10.00	2.46	3.00
"Albatross" Peruvian Formula.....	10.00	1.64	4.00
Peruvian Top Dresser.....	8.00	6.99	3.50
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	14.80	....
Dried Blood .....	....	13.10	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Pamlico Chemical Co., Washington, N. C.—

Pamlico 16 Per Cent Acid Phosphate.....	16.00	....	....
Pamlico Bone Phosphate.....	14.00	....	....
Dissolved Bone and Potash.....	10.00	....	2.00
Blount's Special Cotton Grower.....	9.00	2.27	2.00
Prosperity Cotton Grower.....	9.00	2.26	2.00
Cowell's Great Potato Grower.....	8.00	4.12	7.00
Pamlico S-4-4 Guano.....	8.00	3.30	4.00
Bull's Eye Tobacco Grower.....	8.00	3.30	4.00
Early Sweet Potato.....	8.00	2.47	10.00
Pamlico High Grade Tobacco Grower.....	8.00	2.47	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Success Guano.....	8.00	2.47	3.00
Blount's Special Tobacco Grower.....	8.00	2.47	3.00
Tobacco Growers' Friend.....	8.00	2.47	3.00
Farmers' Best Guano.....	8.00	2.06	3.00
Pamlico Bone and Fish Guano.....	8.00	1.65	2.00
Pamlico Cotton Guano.....	8.00	1.65	2.00
Pamlico 7-7-7 Guano.....	7.00	5.77	7.00
Pamlico Special Irish Potato Guano.....	7.00	4.12	7.00
Pamlico Special Sweet Potato Guano.....	7.00	4.12	5.00
Pamlico Favorite Potato Guano.....	7.00	4.12	5.00
Blount's H. G. Potato Grower.....	7.00	4.12	5.00
Faulkland H. G. Tobacco Guano.....	6.00	2.47	6.00
Acidulated Fish Scrap.....	5.50	7.82	....
Cowell's Great Cabbage Grower.....	5.00	8.25	2.50
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Pamlico Ground Fish.....	....	8.25	....
Sulphate of Potash.....	....	....	55.00
Muriate of Potash.....	....	....	48.00
German Kainit.....	....	....	12.00

*Planters Fertilizer and Phosphate Co., Charleston,
S. C.—*

16 Per Cent Acid Phosphate.....	16.00	....	....
Planters' High Grade Acid Phosphate.....	14.00	....	....
Excelsior H. G. Acid Phosphate.....	14.00	....	....
Planters' Soluble Bone.....	13.00	....	....
Planters' Bone and Potash.....	12.00	....	1.00
Planters' Special Meal Mixture.....	10.00	1.65	2.00
Planters' Grain Grower.....	10.00	.82	3.00
Planters' Acid and Potash.....	10.00	....	4.00
Planters' Bone and Potash.....	10.00	....	2.00
Planters' Blood and Fish Guano.....	9.00	1.65	3.00
Planters' Special Mixture.....	9.00	.82	3.00
Planters' Special Mixture.....	8.00	4.12	5.00
Planters' Special Cotton Fertilizer.....	8.00	3.29	4.00
Planters' Bright Tobacco Fertilizer.....	8.00	3.29	4.00
Planters' Cotton and Corn Fertilizer.....	8.00	2.47	4.00
Planters' H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Planters' Soluble Guano.....	8.00	2.47	3.00
Planters' Fertilizer.....	8.00	2.06	2.00
Planters' Standard Fertilizer.....	8.00	1.65	2.00
Planters' Bone and Potash.....	8.00	....	4.00
Planters' H. G. Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	14.83	....
Planters' Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Planters' German Kainit.....	....	....	12.00

Planters Guano Co., Dunn, N. C.—

Uncle Zeb.....	9.50	2.75	5.00
Bull of the Field.....	8.00	3.00	4.00
Planters' Special.....	8.00	3.00	3.00
Dunn Hustler.....	8.00	3.00	3.00
Sampson Cotton Grower.....	8.00	2.00	2.00

Pearsall & Co., Wilmington, N. C.—

Pearsall's H. G. Acid Phosphate.....	16.00
Pearsall's H. G. Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Pearsall's Bone and Potash.....	10.00	....	4.00
Davis' Special	8.00	3.29	4.00
Fish and Potash Compound.....	8.00	3.29	4.00
Bone Meal and Fish.....Total	8.00	3.29	4.00
Pearsall's Berry Guano.....	8.00	2.47	10.00
Pearsall's Useme Guano.....	8.00	2.47	3.00
Pearsall's High Grade Tobacco.....	8.00	2.47	3.00
Pearsall's F. F. F. G.....	8.00	2.47	3.00
Pearsall's Corn Guano.....	8.00	1.65	3.00
Pearsall's Eagle	8.00	1.65	2.00
Pearsall's Potato and Truck Guano.....	6.00	4.12	7.00
Nitrate of Soda.....	....	14.80	....
Ground Fish .....	....	8.22	....
Pearsall's Top Dresser.....	....	7.42	3.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pacific Guano Co., Charleston, S. C.—

Standard Pacific Acid Phosphate.....	12.00	....	....
Standard Soluble Pacific Guano.....	8.50	1.65	2.00
High Grade Pacific Fertilizer.....	8.00	2.46	3.00

Powhatan Chemical Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone Meal.....Total	22.50	3.70	....
Magic Dissolved Bone Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
Powhatan Acid Phosphate.....	13.00	....	....
High Grade Bone and Potash Mixture.....	12.00	....	5.00
Virginia Dissolved Bone.....	12.00	....	....
Magic Corn Grower.....	10.00	.82	1.00
Magic Crop Grower.....	10.00	.82	1.00
Magic Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Guilford Special Tobacco Fertilizer.....	9.00	2.47	6.00
Ralling's Special Fertilizer.....	9.00	2.47	2.00
Johnson's Best Fertilizer.....	9.00	2.06	5.00
Economic Cotton Grower.....	9.00	2.26	2.00
Holt's Magic Fertilizer.....	9.00	2.06	5.00
Powhatan Special Fertilizer.....	9.00	1.65	2.00
Magic Mixture	9.00	1.65	1.00
Magic Wheat Grower.....	9.00	.82	2.00
King Trucker	8.00	4.11	5.00
North State Special.....	8.00	3.29	4.00
Magic Fertilizer	8.00	2.47	4.00
Johnson's Special Fertilizer.....	8.00	2.47	3.00
King Brand Fertilizer.....	8.00	2.06	3.00
P. C. Co.'s Hustler.....	8.00	2.47	3.00
White Leaf Tobacco Fertilizer.....	8.00	2.06	3.00
Magic Cotton Grower.....	8.00	1.65	2.00
Magic Special Fertilizer.....	8.00	1.65	2.00
Magic Tobacco Grower.....	8.00	1.65	2.00
Magic Peanut Special.....	8.00	.82	4.00
Magic Peanut Grower.....	8.00	....	4.00
Magic Grain and Grass Grower.....	8.00	....	4.00
Powhatan Bone and Potash Mixture.....	8.00	....	4.00
Powhatan Trucker	7.00	4.94	5.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Muriate of Potash.....	50.00
Sulphate of Potash.....	48.00
H. G. German Potash.....	16.00
Pure German Kainit.....	12.00

Pine Level Oil Mill Co., Pine Level, N. C.—

Pine Level 16 Per Cent Acid Phosphate.....	16.00
Pine Level 14 Per Cent Acid Phosphate.....	14.00	....	....
Sutton's Potato Guano.....	9.00	2.88	5.00
Xantho Tobacco Guano.....	8.00	3.30	4.00
Oliver's Truck Grower Guano.....	8.00	3.30	4.00
Hale's Special for Tobacco.....	8.00	2.47	4.00
Pine Level High Grade.....	8.00	2.47	3.00
Cotton Grower for All Crops.....	8.00	1.65	2.00
H. G. Top Dresser.....	3.00	6.03	6.00
Nitrate of Soda.....	....	15.22	....
Muriate Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Patapsco Guano Co., Baltimore, Md.—

Patapsco Pure Ground Bone.....Total	20.59	3.70
Florida Soluble Phosphate.....	16.00	....	....
Patapsco Pure Dissolved S. C. Phosphate.....	14.00	....	....
Patapsco High Grade Phosphate and Potash..	11.00	....	5.00
Baltimore Soluble Phosphate.....	11.00	....	2.00
Patapsco 10 and 4 Potash Mixture.....	10.00	....	4.00
Patapsco Soluble Phosphate and Potash.....	10.00	....	2.00
Patapsco Guano for Tobacco.....	9.25	2.06	2.00
Patapsco Guano.....	9.25	2.06	2.00
Patapsco Tobacco Fertilizer.....	9.00	2.47	3.00
Coon Brand Guano.....	9.00	.82	3.00
Patapsco Cotton and Tobacco Special.....	8.00	3.29	4.00
Patapsco Plant Food for Tobacco, Potatoes and Truck.....	8.00	2.47	5.00
Choctaw Guano.....	8.00	2.47	3.00
Patapsco Special Tobacco Mixture.....	8.00	2.06	3.00
Unicorn Guano.....	8.00	2.06	3.00
Swanson's Gold Leaf Special.....	8.00	2.06	2.00
Planters Favorite.....	8.00	1.65	2.00
Sea Gull Ammoniated Guano.....	8.00	1.65	2.00
Grange Mixture.....	8.00	1.65	2.00
Patapsco 7-7-7 Truck Guano.....	7.00	5.76	7.00
Patapsco Trucker for Early Vegetables.....	7.00	4.11	5.00
Money Maker Guano.....	7.00	3.70	6.00
Ground Fish.....Total	6.00	8.23	....
Patapsco Potato Guano.....	6.00	4.11	7.00
Patapsco Crop Dresser.....	4.00	3.29	4.00
Sulphate of Ammonia.....	....	20.16	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pocahontas Guano Co., Lynchburg, Va.—

Fine Ground Bone Meal.....Total	23.00	2.47	....
Pure Raw Bone Meal.....Total	22.00	3.71	....
Carrington's S. C. Phosphate. Waukesha Brand.....	16.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Imperial Dissolved S. C. Phosphate.....	14.00	....	....
Wabash Wheat Mixture.....	10.00	....	4.00
Carrington's Superior Grain Compound.....	10.00	....	2.00
Pocahontas Special Tobacco Fertilizer.....	9.00	2.47	3.00
High Grade 4 Per Cent Tobacco Compound, Mohawk King	9.00	1.85	4.00
Yellow Tobacco Special.....	9.00	1.65	2.00
Standard Tobacco Guano, Old Chief Brand...	9.00	1.65	2.00
Indian Tobacco Grower.....	8.00	2.47	4.00
Farmers' Favorite Apex Brand.....	8.00	2.47	3.00
Special Truck Grower, Eagle Mount Brand...	8.00	2.06	6.00
Spot Cash Tobacco Compound.....	8.00	2.06	3.00
Carrington's Banner Brand Guano.....	8.00	1.65	2.00
A. A. Complete Champion Brand.....	8.00	1.00	3.00
Cherokee Grain Special.....	8.00	....	4.00

Planters Cotton Seed Oil Co., Rocky Mount, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Royal Cotton Grower.....	9.00	2.26	2.00
Gorham H. G. Guano.....	8.00	3.29	4.00
Tar River Special.....	8.00	2.47	3.00
Planters' C. S. Oil Co.'s Tobacco Guano.....	8.00	2.47	3.00
Planters' C. S. Oil Co.'s Cotton Guano.....	8.00	1.65	2.00
Eagle Guano	8.00	1.65	2.00
Planters Special Potato Guano.....	7.00	4.12	5.00
E. L. D. Special.....	7.00	2.47	3.00
Braswell's Special for Tobacco.....	7.00	2.26	3.50
Planters' Top Dresser.....	3.50	7.82	3.00
Nitrate of Soda.....	....	15.65	....
Ground Fish Scrap.....	....	8.23	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Piedmont Bone Meal.....Total	21.00	3.29	....
Piedmont 16 Per Cent Acid Phosphate.....	16.00	....	....
Piedmont 14 Per Cent Acid Phosphate.....	14.00	....	....
Piedmont Special Potash Mixture.....	10.00	....	5.00
Levering's Potashed Bone.....	10.00	....	4.00
Piedmont Farmers' Bone and Potash.....	10.00	....	2.00
Piedmont Farmers' Standard.....	9.00	1.65	2.00
Piedmont Essential Tobacco Compound.....	9.00	1.65	2.00
Piedmont Farmers' Cotton Grower.....	9.00	.82	3.00
Levering's Ammoniated Bone.....	9.00	.82	3.00
Piedmont Special Farmers' Tobacco Guano...	8.40	2.47	4.00
Piedmont General Truck Grower.....	8.00	4.12	5.00
Piedmont Unexcelled Guano.....	8.00	3.29	4.00
Piedmont High Grade Ammoniated Bone and Potash	8.00	2.47	3.00
Piedmont High Grade Guano for Cotton.....	8.00	2.47	3.00
Levering's Reliable Tobacco Guano.....	8.00	2.47	3.00
Piedmont Guano for Tobacco.....	8.00	2.06	3.00
Piedmont Guano for All Crops.....	8.00	2.06	3.00
Levering's Standard	8.00	1.65	3.00
Piedmont Bone and Peruvian Mixture.....	8.00	1.65	2.00
Piedmont Special for Cotton, Corn and Pea- nuts	8.00	1.65	2.00
Piedmont Red Leaf Tobacco Guano.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Piedmont Cultivator Brand.....	8.00	1.65	2.00
Piedmont Farmers' Favorite.....	8.00	.82	4.00
Piedmont Star Bone and Potash.....	8.00	....	5.00
Piedmont's 7-7-7 Truck Guano.....	7.00	5.76	7.00
Piedmont 5-7-5 Guano.....	7.00	4.12	5.00
Piedmont Special Truck Fertilizer.....	6.00	5.76	7.00
Piedmont Special Potato Guano.....	6.00	4.94	7.00
Piedmont Early Vegetable Manure.....	6.00	4.12	7.00
Piedmont Early Trucker.....	6.00	4.12	5.00
Piedmont Vegetable Compound.....	6.00	3.29	8.00
Piedmont Potato Producer.....	5.00	2.47	6.00
Sulphate of Ammonia.....	....	20.58	....
Nitrate of Soda.....	....	15.22	....
Boykin's Top Dresser.....	....	7.41	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00

The Quinnepiac Co., Charleston, S. C.—

Standard Quinnepiac Acid Phosphate.....	13.00	....	....
Standard Quinnepiac Pine Island Ammoniated Superphosphate	9.00	1.85	1.00

The Robertson Fertilizer Co., Norfolk, Va.—

Robertson's Raw Bone Meal.....Total	21.00	3.71	....
High Peak Acid Phosphate.....	16.00	....	....
Scepter Brand Acid Phosphate.....	14.00	....	....
Robertson's Dissolved Bone.....	13.00	2.06	....
J. W. S. Special Bone and Potash Mixture....	12.00	....	5.00
J. W. S. Alkaline Bone.....	10.00	....	5.00
Skyscraper Bone and Potash Compound.....	10.00	....	4.00
Level Run Dissolved Bone and Potash.....	10.00	....	2.00
Beaver Brand Soluble Guano.....	9.00	1.85	4.00
Robertson's Blood and Bone Mixture.....	9.00	1.00	2.00
P. M. C. High Grade Soluble Guano.....	8.00	4.12	7.00
Wood's Winner H. G. Guano.....	8.00	3.30	4.00
Robertson's Soluble H. G. Guano.....	8.00	2.47	4.00
Robertson's Special Formula for Tobacco....	8.00	2.47	3.00
Big Cropper High Grade Guano.....	8.00	2.47	3.00
Robertson's X-(T) Tobacco Grower.....	8.00	2.06	2.00
Double Dollar Soluble Guano.....	8.00	1.65	2.00
Ten Strike Soluble Crop Producer.....	8.00	1.00	4.00
M. C. Special Bone and Potash Mixture.....	8.00	....	4.00
Robertson's 5-6-7	6.00	4.12	7.00
Robertson's 7 Per Cent for Truck.....	5.00	5.77	5.00
Robertson's 10 Per Cent Truck Guano.....	2.00	8.25	2.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Fish .....	....	9.04	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

F. S. Royster Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Royster's H. G. 17 Per Cent Acid Phosphate..	17.00	....	....
Royster's H. G. 16 Per Cent Acid Phosphate..	16.00	....	....
Royster's 14 Per Cent Acid Phosphate.....	14.00	....	....
Royster's Dissolved Bone.....	13.00	....	....
Royster's XX Acid Phosphate.....	12.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Royster's Bone and Potash Mixture.....	11.00	....	5.00
Royster's Soluble Guano.....	10.00	1.65	2.00
Royster's 10 and 5 Bone and Potash Mixture..	10.00	....	5.00
Royster's 10 and 4 Bone and Potash Mixture..	10.00	....	4.00
Royster's Bone and Potash for Grain.....	10.00	....	3.00
Royster's Bone and Potash Mixture.....	10.00	....	2.00
Royster's 4-9-5 Special.....	9.00	3.30	5.00
Tomlinson's Special	9.00	2.47	5.00
Royster's Meal Mixture.....	9.00	2.26	2.00
Royster's Cotton Grower.....	9.00	2.26	2.00
Watkins' Special	9.00	2.06	5.00
Haynes' Special	9.00	2.06	3.00
Viking Ammoniated Guano.....	9.00	1.65	3.00
Special Compound	9.00	1.65	1.00
Royster's Special 1-9-2 Guano.....	9.00	.82	2.00
Royster's Best Guano.....	8.00	3.71	7.00
Cobb's High Grade for Tobacco.....	8.00	3.30	5.00
Trucker's Delight	8.00	3.30	4.00
Milo Tobacco Guano.....	8.00	3.30	4.00
Jupiter High Grade Guano.....	8.00	3.30	4.00
Royster's Special 4-8-3.....	8.00	3.30	3.00
Black Wrapper Special Tobacco Guano.....	8.00	3.30	2.00
Eagle's Special Tobacco Guano.....	8.00	2.47	5.00
Bonanza Tobacco Guano.....	8.00	2.47	3.00
Marlboro High Grade Cotton Guano.....	8.00	2.47	3.00
Royster's Special Sweet Potato Guano.....	8.00	2.47	3.00
Williams' Special Guano.....	8.00	2.06	5.00
Orinoco Tobacco Guano.....	8.00	2.06	3.00
Special Tobacco Compound.....	8.00	2.06	2.00
Corbett & Moore's Special.....	8.00	1.65	3.50
Royster's Special Wheat Fertilizer.....	8.00	1.65	2.00
Royster's Complete Guano.....	8.00	1.65	2.00
Farmers' Bone Fertilizer.....	8.00	1.65	2.00
Webb's Korn King.....	8.00	1.65	2.00
Farmers' Bone Fertilizer for Tobacco.....	8.00	1.65	2.00
Jumbo Peanut Grower.....	8.00	1.02	4.00
Royster's 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Royster's Special 7 Per Cent Truck Guano...	7.00	5.77	7.00
Royster's Early Truck Guano.....	7.00	4.12	8.00
Royal Special Potato Guano.....	7.00	4.12	7.00
Royal Potato Guano.....	7.00	4.12	5.00
Pasquotank Potato Guano.....	7.00	3.30	8.00
Royster's Peanut Special.....	7.00	....	5.00
Ballentine's Potato Guano.....	6.00	5.77	7.00
Arrow Potato Guano.....	6.00	5.77	5.00
Royster's Irish Potato Guano.....	6.00	4.12	7.00
Royster's Special	6.00	4.12	5.00
Oakley's Special Tobacco Guano.....	6.00	3.30	4.00
McDowell's Cotton Grower.....	6.00	3.30	2.00
Humphrey's Special for Tobacco.....	6.00	2.55	3.20
Royster's 2-6-5 Special.....	6.00	1.65	5.00
Wiggins' Special	5.50	3.30	3.00
Royster's Cabbage Guano.....	5.00	8.23	2.50
Royster's Special 10 Per Cent Truck Guano..	5.00	8.24	3.00
Harvey's Cabbage Guano.....	5.00	6.59	3.00
Royster's Potato Guano.....	5.00	4.94	7.00
Phillips' Special.....	5.00	1.65	6.00
Presto Top Dresser.....	4.00	8.22	4.00
Royster's Special Top Dresser.....	4.00	6.18	2.50
Royster's 4-6-4 Special.....	4.00	4.94	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Dried Fish Scrap.....	3.00	9.05	....
Ground Fish Scrap.....	3.00	8.25	....
Nitrate of Soda.....	....	15.22	....
Magic Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Manure Salts .....	....	....	20.00
Genuine German Kainit.....	....	....	12.00

Robersonville Guano Co., Robersonville, N. C.—

Roberson's H. G. Acid Phosphate.....	16.00
Roberson's H. G. Tobacco Grower.....	8.00	2.47	3.00
Roberson's H. G. Fish and Meal Guano.....	8.00	2.47	3.00
Roberson's H. G. Cotton Grower.....	8.00	2.47	3.00
Roberson's Special 7-7-7 Potato Grower.....	7.00	5.77	7.00
Roberson's H. G. Truck Guano.....	7.00	4.12	5.00
Roberson's 7 Per Cent Potato Guano.....	6.00	5.77	5.00
Roberson Genuine German Kainit.....	....	....	12.00

Richmond Guano Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone Meal.....Total	22.50	3.70	....
Rex Dissolved Bone Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
High Grade Wheat and Grass Fertilizer.....	14.00	....	....
Premium Bone and Potash Mixture.....	13.00	....	3.00
Premium Dissolved Bone.....	13.00	....	....
Hunter & Dunn's Dissolved Bone.....	13.00	....	....
H. G. Bone and Potash Mixture.....	12.00	....	5.00
Old Homestead Dissolved Bone.....	12.00	....	....
Dissolved S. C. Phosphate.....	12.00	....	....
Premium Corn Grower.....	10.00	.82	1.00
Bone Mixture	10.00	.82	1.00
Rex Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Sanders' Special Formula for Bright Tobacco, Hunter & Dunn's Special Ammoniated Fer- tilizer	9.00	2.88	5.00
Collins' Special Fertilizer.....	9.00	2.47	2.25
Carolina Cotton Grower.....	9.00	2.47	2.00
Burton's Special Tobacco Fertilizer.....	9.00	2.26	2.00
Lowery's Special Fertilizer.....	9.00	2.06	3.00
Cracker Jack Fertilizer.....	9.00	1.65	3.00
Bone Mixture	9.00	1.65	2.00
Premium Cotton Grower.....	9.00	1.65	1.00
Premium Wheat Grower.....	9.00	.82	3.00
Southern Trucker	9.00	.82	2.00
Perfection Special	8.00	4.11	5.00
Carolina Bright Tobacco Fertilizer.....	8.00	3.29	4.00
Gilt Edge Fertilizer.....	8.00	2.47	3.00
Carolina Bright Special Tobacco Fertilizer....	8.00	2.26	2.50
Tip Top Fertilizer.....	8.00	2.06	3.00
Carolina Bright for Cotton.....	8.00	2.06	1.50
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25
Benson's Favorite Fertilizer.....	8.00	1.65	10.00
Benson's Special Fertilizer.....	8.00	1.65	6.00
Rex Tobacco Fertilizer.....	8.00	1.65	4.00
Premium Tobacco Fertilizer.....	8.00	1.65	2.00
Premium Brand Fertilizer.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Hunter & Dunn's Ammoniated Fertilizer.....	8.00	1.65	2.00
Parker & Hunt's Special Tobacco Fertilizer...	8.00	1.65	2.00
Parker & Hunt's Special Fertilizer.....	8.00	1.65	2.00
Edgecombe Cotton Grower.....	8.00	1.65	2.00
Premium Grain Special.....	8.00	.82	4.00
Premium Peanut Special.....	8.00	.82	4.00
Parker & Hunt's Corn Fertilizer.....	8.00	.82	3.00
Premium Peanut Grower.....	8.00	....	4.00
Tip Top Bone and Potash Mixture.....	8.00	....	4.00
Winter Grain and Grass Grower.....	8.00	....	4.00
Clark's Special Formula.....	7.00	4.94	6.00
Special High Grade for Truck.....	7.00	4.94	5.00
Smith's 7 Per Cent Special.....	6.00	5.76	5.00
10 Per Cent Cabbage Guano.....	6.00	8.23	2.00
Carter's Special for Tobacco.....	4.00	2.47	6.00
Smith's Special Fertilizer.....	4.00	1.65	7.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Red Cross Guano Co., Lynchburg, Va.—

Red Cross Bone Meal.....Total	22.00	3.00
Red Cross H. G. Phosphate.....	16.00	....	....
Red Cross Standard Phosphate.....	14.00	....	....
Red Cross Grain Grower.....	10.00	....	4.00
Red Cross Bone and Potash.....	10.00	....	2.00
Red Cross for Tobacco and Truck.....	9.00	1.85	4.00
Red Cross for Bright Tobacco.....	9.00	1.65	2.00
Red Cross Special for Tobacco.....	8.00	2.47	3.00
Red Cross Tobacco Guano.....	8.00	2.06	8.00
Red Cross Crop Grower.....	8.00	1.65	2.00

Rasin-Monumental Co., Baltimore, Md.—

Rasin 16 Per Cent Acid Phosphate.....	16.00
Rasin 14 Per Cent Acid Phosphate.....	14.00	....	....
Rasin 13 Per Cent Acid Phosphate.....	13.00	....	....
Rasin Special Bone and Potash.....	10.00	....	....
Rasin Bone and Potash.....	10.00	....	2.00
Rasin Dixie Guano.....	9.00	1.65	2.00
Baltimore Special Mixture.....	9.00	.82	2.00
Rasin Gold Standard.....	8.00	2.47	3.00
Rasin's Indian Brand for Tobacco.....	8.00	2.47	3.00
Rasin Empire Guano.....	8.00	1.65	2.00

Read Phosphate Co., Charleston, S. C.—

Read's H. G. Dissolved Bone.....	16.00	....	....
Read's H. G. Acid Phosphate.....	14.00	....	....
Read's Bone and Potash.....	10.00	....	4.00
Read's Alkaline Bone.....	10.00	....	2.00
Read's Manipulated Guano.....	9.00	1.65	3.00
Read's Ammoniated Dissolved Bone.....	8.00	3.30	6.00
Read's H. G. Guano.....	8.00	3.30	4.00
Read's H. G. Tobacco Leaf.....	8.00	2.47	3.00
Read's H. G. Cotton Grower.....	8.00	2.47	3.00
Read's Soluble Fish Guano.....	8.00	1.65	2.00
Read's Blood and Bone Fertilizer, No. 1.....	8.00	1.62	2.00
Read's Special Potash Mixture.....	8.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	19.00	....
Muriate of Potash.....	48.00
German Kainit	12.00

Reidsville Fertilizer Co., Reidsville, N. C.—

Reidsville Acid Phosphate.....	16.00	....	....
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Lion Brand Fertilizer.....	9.00	2.47	6.00
Reidsville Hustler	9.00	.82	2.00
Royal Fertilizer	8.00	2.47	3.00
Climax Fertilizer	8.00	2.06	3.00
Broad Leaf Tobacco Guano.....	8.00	1.85	2.50
Banner Fertilizer	8.00	1.65	2.00
Champion Guano	8.00	1.65	2.00
Bone and Potash.....	8.00	....	4.00
Muriate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

Rowan Chemical Co., Salisbury, N. C.—

Rowan Grain Chemicals.....	20.00	12.00
Rowan Tobacco, Cotton and Application Guano.	16.00	4.93	6.00
Rowan 16 Per Cent Acid Phosphate.....	16.00	....	....
Rowan 14 Per Cent Acid Phosphate.....	14.00	....	....
Rowan 13 Per Cent Acid Phosphate.....	13.00	....	....
Rowan Success Guano.....	12.00	3.29	8.00
Rowan Bone and Potash.....	12.00	....	6.00
Rowan Bone and Potash.....	12.00	....	3.00
Rowan 12 Per Cent Acid Phosphate.....	12.00	....	....
Rowan Crop Grower.....	10.00	1.65	2.00
Rowan H. G. Bone and Potash.....	10.00	....	6.00
Rowan Bone and Potash.....	10.00	....	5.00
Rowan Grain Mixture.....	10.00	....	4.00
Rowan Bone and Potash.....	10.00	....	3.00
Rowan Bone and Potash.....	10.00	....	2.00
Rowan Fish and Blood Guano.....	9.00	.82	3.00
Rowan Top Dresser.....	8.00	7.44	3.00
Rowan Trucker's Favorite.....	8.00	5.77	5.00
Rowan Strict Middling Guano.....	8.00	3.29	6.00
All Crop Manure.....	8.00	3.29	4.00
Rowan Double Header Guano.....	8.00	2.47	3.00
Rowan Double Header Guano for Tobacco....	8.00	2.47	3.00
Rowan Fish Guano for Tobacco.....	8.00	2.06	3.00
Rowan Heavy Weight Tobacco Guano.....	8.00	2.06	2.00
Rowan Premium Guano.....	8.00	1.65	10.00
Rowan Special for Cotton and Tobacco.....	8.00	1.65	5.00
Rowan Bone Guano.....	8.00	1.65	3.00
Rowan Double Quick Guano.....	8.00	1.65	2.00
Rowan Double Quick Guano for Tobacco....	8.00	1.65	2.00
Rowan Wheat Mixture.....	8.00	....	4.00
Rowan Truck Guano.....	7.00	3.29	5.00
Nitrate of Soda.....	....	14.82	....
Rowan Muriate of Potash.....	....	....	50.00
Rowan Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Swift Fertilizer Works, Atlanta, Ga., Wilmington, N. C., and Chester, S. C.—

Swift's Pure Raw Bone Meal.....Total	23.00	3.71	....
Swift's Pure Bone Meal.....Total	23.00	2.47	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Swift's Special High Grade Acid Phosphate..	16.00	....	....
Swift's Cultivator High Grade Acid Phosphate.	14.00	....	....
Swift's Harrow Standard Grade Acid Phosphate	13.00	....	....
Swift's Special High Grade Phosphate and Potash	12.00	....	6.00
Swift's Atlanta High Grade Phosphate and Potash	12.00	....	4.00
Swift's Chattahoochee Standard Grade Acid Phosphate	12.00	....	....
Swift's Corn and Cotton Grower H. G. Guano.	10.00	2.47	3.00
Swift's Eagle High Grade Guano.....	10.00	1.65	2.00
Swift's Plow Boy Guano.....	10.00	.82	1.00
Swift's Farmer's Home High Grade Phosphate and Potash.....	10.00	....	4.00
Swift's Field and Farm Standard Grade Phosphate and Potash.....	10.00	....	2.00
Swift's Wheat Grower Standard Grade Phosphate and Potash.....	10.00	....	2.00
Swift's Special High Grade Guano.....	9.50	4.12	3.00
Swift's Blood, Bone and Potash High Grade Guano	9.50	3.29	7.00
Swift's Cotton King High Grade Guano.....	9.00	2.47	2.00
Swift's Special Cotton Guano.....	9.00	2.26	2.00
Swift's Gold Medal C. S. M. Compound H. G. Guano	9.00	1.65	3.00
Swift's Farmer's Favorite High Grade Guano.	9.00	1.65	3.00
Swift's Cotton Plant Standard Grade Guano..	9.00	1.65	1.00
Swift's Cape Fear Truck Guano, H. G.....	8.00	4.12	2.00
Swift's Monarch H. G. Guano Vegetable Grower	8.00	3.29	4.00
Swift's Strawberry Grower H. G. Guano.....	8.00	2.47	10.00
Swift's Carolina Tobacco Grower H. G. Guano.	8.00	2.47	3.00
Swift's Ruralist High Grade Guano.....	8.00	2.47	3.00
Swift's Plow Boy C. S. M. Compound H. G. Guano	8.00	2.47	3.00
Swift's Special Blood Guano for Cotton or Tobacco, H. G.....	8.00	2.06	3.00
Swift's Pioneer High Grade Guano Tobacco Grower	8.00	1.65	4.00
Clark's Special Cotton Grower, G. G.....	8.00	1.65	3.00
Swift's Red Steer Standard Grade Guano.....	8.00	1.65	2.00
Swift's Golden Harvest Standard Grade Guano	8.00	1.65	2.00
Swift's Special Peanut Grower Standard Grade Guano	8.00	.82	4.00
Swift's Plantation Standard Grade Phosphate and Potash	8.00	....	4.00
Swift's Carolina 7 Per Cent Special Trucker H. G. Guano.....	7.00	5.76	7.00
Swift's Special Irish Potato Grower H. G. Guano	7.00	4.12	8.00
Swift's Early Trucker H. G. Guano.....	7.00	4.12	5.00
High Grade Swift's No. 1 Ground Tankage...	6.00	8.24	....
Swift's Special Trucker H. G. Guano.....	6.00	5.76	5.00
Swift's Favorite Truck Guano H. G.....	6.00	4.94	6.00
Swift's Special Potato Grower H. G. Guano..	6.00	4.12	7.00
Swift's Special 10 Per Cent Blood and Bone Trucker H. G. Guano.....	5.00	8.23	3.00
Swift's Excelsior Top Dresser H. G. Guano...	4.00	6.18	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Avail.	Nitrogen.	Potash.
Swift's Pure Nitrate of Soda.....	14.82	....
Swift's Ground Dried Blood.....	13.48	....
Swift's Muriate of Potash.....	50.00
Swift's Sulphate of Potash.....	40.00
Swift's Pure German Kainit.....	12.00

Southern Chemical Co., Inc., Roanoke, Va.—

Pride of Virginia	8.00	2.47	3.00
Valley Queen	8.00	1.65	10.00
Farmers' Joy	8.00	1.65	4.00
Our Favorite	8.00	1.65	2.00

Spartanburg Fertilizer Co., Spartanburg, S. C.—

Tiger Brand Acidulated Phosphate.....	14.00	....	....
West's Potash Acid.....	13.00	....	3.00
Gosnell's Plant Food.....	10.50	2.46	2.00
N. C. Special.....	10.50	1.65	8.00
Coru Formula	10.50	1.65	5.00
Dana's Best	10.00	....	4.00
Melrose	10.00	....	2.00
Boll Buster	9.00	1.65	2.00
Glencoe	8.00	2.46	3.00
Cotton Compound	8.75	1.65	2.00
Potato Guano	7.00	2.46	7.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	48.00

Scotland Neck Guano Co., Scotland Neck, N. C.—

Our 16 Per Cent Acid Phosphate.....	16.00	....	....
Our 14 Per Cent Acid Phosphate.....	14.00	....	....
Our Bone and Potash Mixture.....	10.00	....	4.00
Noah Biggs' Truck Guano.....	9.00	4.10	5.00
Biggs' Cotton-seed Meal Fish Scrap Guano....	9.00	3.30	4.00
Josey's Cotton-seed Meal and Fish Scrap To- bacco Guano	9.00	2.47	3.00
Old Halifax Cotton-seed Meal and Fish Scrap Tobacco Guano	9.00	2.47	3.00
Our Cotton Growers C. S. M. and Fish Scrap Guano	9.00	2.05	2.50
Our Favorite Cotton-seed Meal Guano.....	9.00	1.65	2.00
Our Bright Tobacco Guano.....	8.00	2.47	3.00
Our Best Peanut Guano.....	5.50	1.23	5.50
K. Elite Top Dressing.....	3.00	7.40	3.50
Nitrate of Soda.....	....	15.50	....
Sulphate of Potash.....	....	....	48.00
Muriate of Potash.....	....	....	48.00
Our Genuine German Kainit.....	....	....	12.00

The Southern Exchange Co., Marton, N. C.—

S. E. C. Acid Phosphate.....	16.00	....	....
S. E. C. Acid Phosphate.....	14.00	....	....
S. E. C. Potash Mixture.....	10.00	....	4.00
S. E. C. Bone and Potash Mixture.....	10.00	....	2.00
Juicy Fruit Fertilizer.....	9.00	1.85	4.00
The Walnut Fertilizer.....	8.50	2.06	2.50
Melon Grower	8.00	4.11	7.00
McKimmon's Special Truck Formula.....	8.00	4.11	7.00
Two Fours Guano.....	8.00	3.29	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Southern Exchange Co.'s Bright Tobacco Formula	8.00	2.17	4.00
That Big Stick Guano.....	8.00	2.17	4.00
Bull of the Woods Fertilizer.....	8.00	2.47	4.00
Jack's Best Fertilizer.....	8.00	2.47	3.00
Correct Cotton Compound.....	8.00	2.47	3.00
R. M. C. Special Crop Grower.....	8.00	2.47	3.00
Southern Exchange Co.'s Special Tobacco Fertilizer	8.00	1.65	3.00
Currie's Crop Lifter.....	8.00	1.65	3.00
The Racer Guano.....	8.00	1.65	3.00
The Coon Guano.....	8.00	1.65	2.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00
<i>Southern Cotton Oil Co., Charleston, S. C.—</i>			
Pioneer	7.00	3.62	5.00
<i>Smith, Ham & Co., Pickville, N. C.—</i>			
Genuine German Kainit.....	....	....	12.00
<i>H. T. Shannonhouse, Hertford, N. C.—</i>			
H. T. Shannonhouse 16 Per Cent Acid Phosphate	16.00	....	....
H. T. Shannonhouse 14 Per Cent Acid Phosphate	14.00	....	....
Shannonhouse Bone and Potash.....	10.00	....	4.00
H. T. S. Full Value.....	8.00	3.29	4.00
Pride of Carolina.....	8.00	3.29	4.00
H. T. S. Favorite.....	8.00	3.29	4.00
Farmers' Tobacco Favorite.....	8.00	2.47	3.00
Num Better	8.00	2.47	3.00
Shannonhouse Blood and Bone.....	8.00	2.47	3.00
Southern Pride	8.00	2.47	3.00
Carolina's Choice	8.00	2.47	3.00
Sunny South	8.00	2.47	3.00
H. T. S. Tobacco Grower.....	8.00	1.65	2.00
Shannonhouse Success	8.00	1.65	2.00
Square Deal	8.00	1.65	2.00
X. L. M. for Cotton and Corn.....	8.00	1.65	2.00
Farmers' Money Maker.....	8.00	1.65	2.00
P. D. Q. Truck Grower.....	6.00	4.11	5.00
Shannonhouse High Grade.....	6.00	4.11	5.00
Genuine German Kainit.....	....	....	12.00
<i>The Southern Cotton Oil Co., Charlotte District, Concord, Charlotte, Davidson, Shelby, Gib- son, Monroe and Wadesboro—</i>			
Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	16.00	....	....
Gold Seal	14.00	....	....
Silver King	13.00	....	....
Conqueror Bone and Potash.....	10.00	....	4.00
Magnolia Bone and Potash.....	10.00	....	2.00
Uncle Sam	9.00	2.47	3.00
Home Made	9.00	2.05	3.00
Razem	9.00	1.65	3.00
King Bee	8.83	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Choice	8.00	3.30	6.00
Conqueror	8.00	3.30	4.00
Canto	8.00	3.29	6.00
Melonite	8.00	3.29	4.00
Peacock	8.00	2.47	3.00
Moon	8.00	2.47	3.00
Landsake	8.00	2.47	2.50
Red Bull	8.00	2.06	2.00
All-to-Good	8.00	2.05	3.00
Gloria	8.00	1.65	2.00
Double Two	8.00	1.65	2.00
Dandy Top Dresser.....	4.00	9.07	2.50
Nitrate of Soda.....	....	15.00	....
Nitrate of Soda.....	....	13.20	....
Labi .....	....	8.99	17.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*Southern Cotton Oil Co., Goldsboro, Fayetteville,
Rocky Mount and Wilson—*

Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	16.00
Southern Cotton Oil Co.'s 14 Per Cent Acid Phosphate	14.00	....	....
Best & Thompson's Special Cotton Grower....	9.00	2.27	2.00
Goldsboro Cotton Grower.....	9.00	2.27	2.00
Goldsboro Oil Mill Special Mixture.....	8.00	3.30	4.00
Fayetteville Oil Mill Special Mixture.....	8.00	3.30	4.00
Wilson Oil Mill Special Mixture.....	8.00	3.30	4.00
Rocky Mount Oil Mill Special Mixture.....	8.00	3.30	4.00
Southern Cotton Oil Co.'s Special Mixture....	8.00	3.30	4.00
Southern Cotton Oil Co. Melon Grower.....	8.00	2.47	10.00
Southern Cotton Oil Co.'s Special Cotton Grower	8.00	2.47	3.00
Best & Thompson's High Grade.....	8.00	2.47	3.00
Goldsboro Oil Mill Special Cotton Grower....	8.00	2.47	3.00
Fayetteville Oil Mill Special Cotton Grower..	8.00	2.47	3.00
Wilson Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Rocky Mount Oil Mill Special Cotton Grower.	8.00	2.47	3.00
B. G. Thompson's Special Cotton and Tobacco Guano	8.00	2.47	3.00
Edgerton's Old Reliable.....	8.00	2.47	3.00
Morning Glory	8.00	2.47	3.00
Goldsboro Oil Mill High Grade.....	8.00	2.27	2.50
Fayetteville Oil Mill High Grade.....	8.00	2.27	2.50
Wilson Oil Mill High Grade.....	8.00	2.27	2.50
The Southern Cotton Oil Co. High Grade....	8.00	2.27	2.50
Southern Cotton Oil Co.'s Peanut Grower....	8.00	1.65	4.00
Goldsboro Oil Mill Standard.....	8.00	1.65	2.00
Fayetteville Oil Mill Standard.....	8.00	1.65	2.00
Wilson Oil Mill Standard.....	8.00	1.65	2.00
Rocky Mount Oil Mill Standard.....	8.00	1.65	2.00
The Southern Cotton Oil Co. Standard.....	8.00	1.65	2.00
Southern Cotton Oil Co. Truck Grower.....	6.00	4.12	7.00

Tidewater Guano Co., Norfolk, Va.—

Tidewater Raw Bone Meal.....Total	21.00	3.71
Top Rail Acid Phosphate.....	16.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Buster Brown Acid Phosphate.....	14.00	....	....
Bully Boy Dissolved Bone and Potash.....	10.00	....	2.00
Diamond Brand Bone and Potash Compound..	10.00	....	2.00
High Tide Soluble Guano.....	8.00	3.30	4.00
Sho Nuf Guano, H. G.....	8.00	2.47	3.00
Hawk Eye Soluble Guano.....	8.00	2.07	2.00
Soil King Special Guano.....	8.00	1.85	4.00
Double Action Soluble Guano.....	8.00	1.65	2.00
"Good Money" Complete Guano.....	8.00	1.00	4.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Tuscarora Fertilizer Co., Atlanta, Ga., and Wilmington, N. C.—

Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....
Tuscarora Alkaline Bone.....	10.00	....	5.00
Tuscarora Acid and Potash.....	10.00	....	4.00
Tuscarora Bone and Potash.....	10.00	....	2.00
Tuscarora Trucker	8.00	4.11	7.00
Fertilizer No. 844.....	8.00	3.30	4.00
Tobacco Special	8.00	2.47	3.00
Cotton Special	8.00	2.47	3.00
Berry King	8.00	2.05	4.00
King Cotton	8.00	2.05	2.00
Tuscarora Champion	8.00	2.05	2.50
Tuscarora Champion Tobacco Grower.....	8.00	2.05	2.50
Tuscarora Fruit and Potato.....	8.00	1.65	10.00
Tuscarora Fertilizer No. 8-2-5.....	8.00	1.65	5.00
Tuscarora Standard	8.00	1.65	2.00
Tuscarora Standard Tobacco Grower.....	8.00	1.65	2.00
Tuscarora Bone and Potash.....	8.00	....	4.00
Big Four (4) Fertilizer.....	7.00	1.65	4.00
Manure Substitute	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Union Guano Co., Winston-Salem, N. C.—

Pure Raw Animal Bone Meal.....Total	22.50	3.71	....
Pure Animal Bone Meal.....Total	22.50	2.47	....
Union 16 Per Cent Acid Phosphate.....	16.00	....	....
Union High Grade Acid Phosphate.....	14.00	....	....
Union Dissolved Animal Bone.....Total	13.00	2.06	....
Union Dissolved Bone.....	13.00	....	....
Union 12-6 Bone and Potash.....	12.00	....	6.00
Union 12-5 Bone and Potash.....	12.00	....	5.00
Union 12-4 Bone and Potash.....	12.00	....	4.00
Union 12-3 Bone and Potash.....	12.00	....	3.00
Union 12-2 Bone and Potash.....	12.00	....	2.00
Union 12 Per Cent Acid Phosphate.....	12.00	....	....
Liberty Bell Crop Grower.....	10.50	....	1.50
Union Prolific Cotton Compound.....	10.00	3.29	4.00
Union Special Formula for Cotton.....	10.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Union Mule Brand Guano.....	10.00	1.65	2.00
Union 10-6 Bone and Potash.....	10.00	....	6.00
Union 10-5 Bone and Potash.....	10.00	....	5.00
Union 10-4 Bone and Potash.....	10.00	....	4.00
Quakers' Grain Mixture.....	10.00	....	4.00
Giant Phosphate and Potash.....	10.00	....	3.00
Finch & Harris' Special Bone and Potash Mixture	10.00	....	3.00
Union Bone and Potash.....	10.00	....	2.00
Union Perfect Cotton Grower.....	9.00	2.26	2.00
Union Complete Cotton Mixture.....	9.00	1.65	3.00
Farmers' Blood and Bone Guano.....	9.00	1.65	3.00
Q and Q (Quality and Quantity) Guano.....	9.00	1.65	1.00
"B. S." Ammoniated Guano.....	9.00	.82	3.00
Union Approved Crop Grower.....	8.75	1.65	2.00
Union Guano for Cotton and Tobacco.....	8.00	3.29	6.00
Union Premium Guano.....	8.00	3.29	4.00
Union Homestead Guano.....	8.00	2.47	3.00
Victoria High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Union Water Fowl Guano.....	8.00	2.06	3.00
Union Standard Tobacco Grower.....	8.00	2.06	2.00
Union Potato Mixture.....	8.00	1.65	10.00
Christian's Special Tobacco Grower.....	8.00	1.65	3.00
Old Honesty Guano.....	8.00	1.65	2.00
Old Honesty Tobacco Guano.....	8.00	1.65	2.00
Fish Brand Ammoniated Guano.....	8.00	1.65	2.00
Union Superlative Guano.....	8.00	.82	4.00
Sunrise Ammoniated Guano.....	8.00	.82	3.00
Union S-5 Bone and Potash.....	8.00	....	5.00
Union Wheat Mixture.....	8.00	....	4.00
Union Vegetable Compound.....	7.00	4.12	8.00
Union Truck Guano.....	7.00	3.29	5.00
Nitrate of Soda.....	....	14.83	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

United States Fertilizer Co., Baltimore, Md.—

Farm Bell Acid Phosphate.....	16.00	....	....
Farm Bell Acid Phosphate.....	14.00	....	....
Farm Bell Phospho. Potassa.....	12.00	....	5.00
Farm Bell Potash and Acid.....	10.00	....	6.00
Farm Bell Special Mixture.....	10.00	....	4.00
Farm Bell Alkaline Mixture.....	10.00	....	2.00
Farm Bell Big Yield.....	9.00	2.47	4.00
Farm Bell Buckeye Guano.....	9.00	.82	2.00
Farm Bell Majestic Guano.....	8.00	3.28	4.00
Farm Bell Tobacco Special.....	8.00	2.47	3.00
Farm Bell Crop Grower.....	8.00	2.06	3.00
Farm Bell Fruit and Potato.....	8.00	1.65	10.00
Farm Bell Animal Ammoniated.....	8.00	1.65	5.00
Farm Bell Standard Guano.....	8.00	1.65	2.00
Farm Bell Pennant Winner.....	8.00	.82	4.00
Farm Bell Phosphate and Potash.....	8.00	....	5.00
Farm Bell Trucker's Ideal.....	7.00	4.11	8.00
Farm Bell Potato and Tobacco Guano.....	7.00	2.47	10.00
Farm Bell 7 Per Cent Trucker.....	6.00	5.75	5.00
Farm Bell Trucker's Favorite.....	6.00	3.28	8.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Union Abattoir Co., Baltimore, Md., and Richmond, Va.—</i>			
Pure Bone and Potash Compound.....	16.00	1.65	2.50
Red Star Acid Phosphate.....	16.00	....	....
Red Star Acid Phosphate.....	14.00	....	....
Red Star Potash and Soluble Bone.....	12.00	....	5.00
Potash and Soluble Bone (Red Star).....	12.00	....	3.00
Pure Dissolved Animal Bone.....	12.00	1.65	....
Red Star Potash and Soluble Bone.....	10.00	....	5.00
Red Star Potash and Soluble Bone.....	10.00	....	2.00
Red Star Brand Tobacco Compound.....	9.00	3.27	2.00
Red Star Brand Cotton Guano.....	8.00	3.28	4.00
Red Star Early Truck and Tobacco Guano...	8.00	3.28	4.00
Red Star Cotton and Tobacco Guano.....	8.00	2.46	3.00
Red Star Tobacco Fertilizer.....	8.00	2.05	2.00
Red Star Cotton Guano.....	8.00	1.65	2.00
Red Star Standard.....	8.00	1.65	2.00
Red Star Grain and Grass.....	8.00	1.00	4.00
Red Star Peanut Grower.....	8.00	1.00	4.00
Red Star Potato Manure.....	7.00	2.46	10.00
Red Star Special Guano.....	7.00	2.46	5.00
Red Star 7 Per Cent Guano.....	6.00	5.74	5.00
Early Truck and Potato Guano.....	6.00	4.10	7.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00
<i>R. L. Upshur, Norfolk, Va.—</i>			
Upshur's 16 Per Cent Acid Phosphate.....	16.00	....	....
Upshur's High Grade Acid Phosphate.....	14.00	....	....
Upshur's Wheat Compound.....	12.00	....	5.00
Upshur's Bone and Potash Guano.....	10.00	....	2.00
Cotton-seed Meal Mixture.....	9.00	2.26	2.00
Upshur's O. P. (Old Plantation).....	9.00	1.65	2.00
Upshur's S-3-3 Cotton.....	8.00	2.47	3.00
Upshur's High Grade Tobacco Guano.....	8.00	2.47	3.00
Upshur's Special 2½-S-3.....	8.00	2.05	3.00
Upshur's F. F. V. (Favorite Fertilizer of Virginia)	8.00	1.65	2.00
Upshur's Peanut Guano.....	8.00	1.65	2.00
Upshur's G., G. & C. Guano.....	8.00	1.65	2.00
Premo Cotton Guano.....	8.00	1.65	2.00
Upshur's Fish, Bone and Potash.....	8.00	1.64	4.00
Upshur's Special Truck Guano.....	7.00	4.11	8.00
Upshur's F. F. (Farmers' Favorite).....	7.00	4.11	6.00
Upshur's New Process Guano.....	6.00	6.58	8.00
Upshur's F. C. (Farmers' Challenge).....	6.00	5.76	6.00
Upshur's 7 Per Cent Irish Potato Guano....	6.00	5.76	5.00
Upshur's 4-6-4 Tobacco Special.....	6.00	3.69	4.00
Upshur's Norfolk Special 10 Per Cent.....	5.00	8.23	2.00
Upshur's Special Potato Guano.....	5.00	5.76	5.00
Upshur's 5 Per Cent.....	5.00	4.11	5.00
Nitrate of Soda.....	....	15.22	....
Ground Fish .....	....	9.04	....
Ground Tankage .....	....	6.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Gemine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Venable Fertilizer Co., Richmond, Va.—</i>			
Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone.....Total	22.50	3.70	....
Venable's Best Acid Phosphate.....	16.00	....	....
H. G. Acid Phosphate.....	14.00	....	....
Venable's Dissolved Bone.....	13.00	....	....
Venable's Standard Acid Phosphate.....	12.00	....	....
Venable's Corn, Wheat and Grass Fertilizer..	10.00	.82	1.00
High Grade Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Roanoke Mixture	9.00	2.26	2.00
Roanoke Meal Mixture.....	9.00	2.26	2.00
Venable's B. B. P. Manure.....	9.00	1.65	1.00
Venable's 5 Per Cent Trucker.....	8.00	4.11	5.00
Venable's 4 Per Cent Trucker.....	8.00	3.29	4.00
Venable's H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Ballard's Choice Fertilizer.....	8.00	2.47	3.00
Venable's Alliance Tobacco Manure, No. 1....	8.00	2.06	3.00
Venable's Cotton Grower.....	8.00	2.06	3.00
Venable's Roanoke Special.....	8.00	2.06	3.00
Venable's Ideal Manure.....	8.00	1.65	5.00
Our Union Tobacco Fertilizer.....	8.00	1.65	4.00
Venable's Alliance Tobacco Manure, No. 2....	8.00	1.65	2.00
Venable's Meal Mixture.....	8.00	1.65	2.00
Our Union Special Fertilizer.....	8.00	1.65	2.00
Planters' Bone Fertilizer.....	8.00	1.65	2.00
Venable's Peanut Special.....	8.00	.82	4.00
Venable's Alliance Bone and Potash Mixture..	8.00	....	4.00
Venable's Peanut Grower.....	8.00	....	4.00
Venable's 10 Per Cent Trucker.....	6.00	8.23	2.00
Venable's 6-6-6 Manure.....	6.00	4.94	6.00
Nitrate of Soda.....	....	15.63	....
Special Top Dresser.....	....	7.30	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Virginia-Carolina Chemical Co., Richmond, Va.—

V.-C. C. Co.'s 17 Per Cent Acid Phosphate....	17.00
V.-C. C. Co.'s 16 Per Cent Acid Phosphate....	16.00	....	....
V.-C. C. Co.'s 14 Per Cent Acid Phosphate....	14.00	....	....
V.-C. C. Co.'s Special High Grade Potash Mix- ture	12.00	....	6.00
V.-C. C. Co.'s H. G. Potash Mixture.....	12.00	....	5.00
V.-C. C. Co.'s 12-4 Grain Grower.....	12.00	....	4.00
V.-C. C. Co.'s Special Crop Grower.....	12.00	....	3.00
V.-C. C. Co.'s Grain Special.....	10.00	....	6.00
V.-C. C. Co.'s Standard Bone and Potash.....	10.00	....	5.00
V.-C. C. Co.'s Special Potash Mixture.....	10.00	....	4.00
V.-C. C. Co.'s Dissolved Bone and Potash....	10.00	....	2.00
V.-C. C. Co.'s Cotton Grower.....	9.00	2.26	2.00
V.-C. C. Co.'s Farmers' Choice.....	8.00	3.29	4.00
V.-C. C. Co.'s Special.....	8.00	3.29	4.00
V.-C. C. Co.'s High Grade Tobacco Fertilizer..	8.00	2.47	10.00
V.-C. C. Co.'s Monarch Brand.....	8.00	1.65	5.00
V.-C. C. Co.'s Corn and Peanut Special.....	8.00	1.65	2.00
V.-C. C. Co.'s Special Peanut Grower.....	8.00	1.00	4.00
V.-C. C. Co.'s Peanut Grower.....	8.00	.82	4.00
V.-C. C. Co.'s Potash Mixture for Peanuts....	8.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
V.-C. C. Co.'s Truck Crop Fertilizer.....	7.00	4.12	7.00
V.-C. C. Co.'s Potash Potato Producer.....	7.00	3.29	8.00
V.-C. C. Co.'s Formula 44 for Bright Wrappers and Smokers	7.00	2.55	3.30
V.-C. C. Co.'s Special Truck Guano.....	6.00	4.12	7.00
V.-C. C. Co.'s High Grade Top Dresser.....	4.00	6.17	2.50
V.-C. C. Co.'s 10 Per Cent Top Dresser Extra H. G.	4.00	8.24	4.00
Johnston's Best	20.00	4.94	6.00
Sludge Acid Phosphate.....	14.00	....	....
Goodman's Special Potash Mixture.....	12.00	....	5.00
Battle's Crop Grower.....	12.00	....	3.00
Home Comfort Acid Phosphate.....	12.00	....	....
Virginia 11-5 Bone and Potash.....	11.00	....	5.00
Sovereign Crop Producer.....	10.00	1.65	2.00
Ford's Wheat and Corn Guano.....	10.00	.82	2.50
Great Texas Cotton Grower Soluble Guano..	9.00	2.47	4.00
Jeffrey's High Grade Guano.....	9.00	2.47	3.00
Southern Cotton Grower.....	9.00	2.29	2.00
Best's Special Cotton Grower.....	9.00	2.26	2.00
Best's H. G. Cotton and Tobacco Grower.....	8.00	2.47	3.00
Powell's Special H. G. C. S. M.....	9.00	2.26	3.00
Prolific Cotton Grower.....	9.00	2.26	2.00
White Stem C. S. M.....	9.00	2.26	2.00
Bumper Crop Guano.....	9.00	2.06	5.00
Cock's Soluble Guano High Grade Animal Bone	9.00	1.85	3.00
Reliable Cotton Brand Fertilizer.....	9.00	1.65	3.00
North State Guano C. S. M.....	9.00	1.65	1.00
Bigelow's Crop Guano.....	9.00	.82	3.00
Burnhardt's Grain and Crop Guano.....	9.00	.82	3.00
McCormick's Wheat and Grain Guano.....	9.00	.82	3.00
Farmers' Friend Favorite Fertilizer Special..	8.50	1.65	2.00
Farmers' Success	8.00	2.47	4.00
Powhatan Crop Mixture	8.50	1.65	1.50
Pelican Peruvian Guano (1,000 pounds Genu- ine Peruvian Guano to the ton).....	8.00	4.12	5.00
Carr's 8-4-4 Crop Grower.....	8.00	3.29	4.00
Jumbo Peruvian Guano (1,000 pounds Genuine Peruvian Guano to the ton).....	8.00	2.47	3.00
Lion's High Grade Tobacco Fertilizer.....	8.00	2.47	4.00
Oldham's Special Compound for Tobacco, H. G.	8.00	2.47	3.00
Blake's Best	8.00	2.47	3.00
Royal High Grade Fertilizer.....	8.00	2.47	3.00
Special High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Adams' Special	8.00	2.47	3.00
Peruvian H. G. Tobacco Guano.....	8.00	2.47	3.00
Red Chief H. G. Cotton Grower.....	8.00	2.47	3.00
Zeno Special Compound for Tobacco, H. G.....	8.00	2.47	3.00
Gold Medal H. G. Tobacco Guano.....	8.00	2.47	3.00
Atlas Guano C. S. M.....	8.00	2.47	2.50
John F. Croom & Bro. Fish and Meal Mixture.	8.00	3.29	4.00
Pace's 5 Per Cent Special Potato Guano.....	8.00	1.65	5.00
The Harvester	8.00	.82	3.00
Pinical Grain Grower.....	8.00	.82	3.00
Dissolved Animal Bone.....	13.00	2.06	....
Pure Raw Bone Meal.....Total	21.50	3.71	....
Pure Animal Bone Meal.....Total	23.00	2.47	....
Admiral	8.00	2.47	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Good Luck C. S. M.....	8.00	2.47	2.50
Split Silk C. S. M.....	8.00	2.47	2.50
Myatt's Special High Grade Fertilizer.....	8.00	2.47	3.00
Orange Grove Guano.....	8.00	2.26	2.50
Delta C. S. M.....	8.00	2.26	2.50
Royal Crown	8.00	2.26	2.00
Blue Star C. S. M.....	8.00	2.06	3.00
Superlative C. S. M. Guano.....	8.00	2.06	3.00
Smith's Irish Potato Guano.....	8.00	1.65	10.00
Parker & Hunter's Special.....	8.00	1.65	4.00
Winston Special for Cotton C. S. M.....	8.00	1.65	2.00
Diamond Dust C. S. M.....	8.00	1.65	2.00
Plant Food C. S. M.....	8.00	1.65	2.00
Wilson's Standard C. S. M.....	8.00	1.65	2.00
Ajax C. S. M. Guano.....	8.00	1.65	2.00
Farmers' Favorite Fertilizer C. S. M.....	8.00	1.65	2.00
Jones' Grain Special.....	8.00	....	4.00
Konqueror H. G. Truck Fertilizer.....	7.00	4.12	5.00
Pasquotank Truck	7.00	3.29	8.00
Invincible High Grade Fertilizer.....	6.00	4.12	7.00
Dewberry's Special	4.00	6.59	....
Sulphate of Ammonia.....	....	20.59	....
Sulphate of Potash.....	....	....	48.00
Nitrate of Soda.....	....	14.82	....
Fish Scrap .....	....	8.24	....
Muriate of Potash .....	....	....	49.00
Manure Salts .....	....	....	20.00
Genuine German Kainit.....	....	....	12.00
Allison & Addison's Fulton Acid Phosphate...	14.00	....	....
Allison & Addison's I. X. L. Acid Phosphate...	13.00	....	....
Allison & Addison's Standard Acid Phosphate...	12.00	....	....
Allison & Addison's Rocket Acid Phosphate...	12.00	....	....
Allison & Addison's B. P. Potash Mixture....	10.00	....	2.00
Allison & Addison's McGavock's Special Pot- ash Mixture	10.00	....	2.00
Allison & Addison's Star Special Tobacco Ma- nure	9.00	2.26	2.00
Allison & Addison's Star Brand Special H. G..	9.00	2.06	5.00
Allison & Addison's Star Brand Guano.....	9.00	1.65	1.00
Allison & Addison's Little Giant Grain and Grass Grower	9.00	.82	2.00
Allison & Addison's A. A. Guano.....	8.00	2.47	3.00
Allison & Addison's Anchor Brand Tobacco Fertilizer	8.50	2.26	2.00
Allison & Addison's Star Vegetable Brand Guano	8.00	3.70	4.00
Allison & Addison's Anchor Brand Fertilizer...	8.00	1.65	2.00
Allison & Addison's Old Hickory Guano.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Acid Phosphate	16.00	....	....
Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Phosphate	14.00	....	....
Atlantic and Virginia Fertilizer Co.'s Cren- shaw Acid Phosphate.....	13.00	....	....
Atlantic and Virginia Fertilizer Co.'s Our Acid Phosphate	12.00	....	....
Nowell's Special	8.00	3.29	4.00
N. and R.'s Best.....	9.00	2.47	3.00
V.-C. C. Co.'s Vececo Cotton Grower.....	9.00	2.26	2.00
3 Per Cent Special C. S. M. Guano, No. 3.....	8.00	2.47	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Diamond C. S. M. Guano.....	8.00	2.47	3.00
Atlantic and Virginia Fertilizer Co.'s Eureka Bone and Potash Compound.....	10.00	....	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9.00	2.06	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Complete Manure	9.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Virginia Truckers	8.00	4.12	5.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Special for Tobacco.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Carolina Truckers	7.00	5.76	7.00
Charlotte Oil and Fertilizer Co.'s 15 Per Cent Acid Phosphate	15.00	....	....
Charlotte Oil and Fertilizer Co.'s Catawba Bone Phosphate	14.00	....	....
Charlotte Oil and Fertilizer Co.'s Charlotte Acid Phosphate	13.00	....	....
Charlotte Oil and Fertilizer Co.'s Dayvault's Special	12.00	....	6.00
Charlotte Oil and Fertilizer Co.'s Charlotte Dissolved Bone	12.00	....	....
Charlotte Oil and Fertilizer Co.'s Oliver's Per- fect Wheat Grower.....	11.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s 10-2 Bone and Potash.....	10.00	....	2.00
Charlotte Oil and Fertilizer Co.'s High Grade Special Tobacco Fertilizer.....	9.00	2.06	2.00
Charlotte Oil and Fertilizer Co.'s Queen of the Harvest C. S. M.....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s McCrary's Diamond Bone and Potash.....	9.00	....	3.00
Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fertilizer.....	8.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s Catawba Guano B. G.....	8.00	2.47	3.00
Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano C. S. M.....	8.00	2.47	2.00
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano B. G.....	8.00	2.06	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano C. S. M.....	8.00	2.06	1.50
The Leader B. G.....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s King Cotton Grower	8.00	1.65	2.00
Davie & Whittle's Owl Brand High Grade Acid Phosphate	16.00	....	....
Davie & Whittle's Owl Brand High Grade Dissolved Bone	14.00	....	....
Davie & Whittle's Owl Brand Acid Phosphate, Davie & Whittle's Owl Brand Dissolved Bone, Davie & Whittle's Owl Brand Acid Phosphate with Potash	13.00 12.00 10.00	.... .... ....	.... .... 2.00
Davie & Whittle's Owl Brand High Grade 3 Per Cent Soluble Guano.....	9.00	2.06	3.00
Davie & Whittle's Owl Brand Special Tobacco Guano	9.00	2.06	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Davie & Whittle's Owl Brand Truck Guano..	8.00	4.94	5.00
Davie & Whittle's Owl Brand Guano for To- bacco	8.00	2.47	3.00
Davie & Whittle's Vinco Guano.....	8.00	1.65	3.00
Davie & Whittle's Owl Brand Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Durham Best Acid Phosphate	16.00	....	....
Durham Fertilizer Co.'s Standard High Grade Acid Phosphate	14.00	....	....
Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate	14.00	....	....
Durham Fertilizer Co.'s Blacksburg Dissolved Bone	13.00	....	....
Durham Fertilizer Co.'s N. C. Farmers' Alli- ance Official Acid Phosphate.....	13.00	....	....
Durham Fertilizer Co.'s Double Bone Phos- phate	13.00	....	....
Durham Fertilizer Co.'s Durham Acid Phos- phate	12.00	....	....
Durham Fertilizer Co.'s Great Wheat Grower.	10.50	....	1.50
Durham Fertilizer Co.'s Diamond Wheat Mix- ture	10.00	....	3.00
Durham Fertilizer Co.'s Standard Wheat and Corn Grower	10.00	....	2.00
Durham Fertilizer Co.'s Blue Ridge Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Standard Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Durham Bone and Potash Mixture	10.00	....	2.00
Durham Fertilizer Co.'s L. & N. Special.....	9.00	2.47	2.00
Durham Fertilizer Co.'s Standard Guano.....	9.00	1.65	2.00
Durham Fertilizer Co.'s Durham Ammoniated Fertilizer	9.00	1.65	1.00
Durham Fertilizer Co.'s Special Plant and Truck Fertilizer	8.00	4.12	3.00
Durham Fertilizer Co.'s Durham High Grade.	8.00	3.29	4.00
Durham Fertilizer Co.'s Gold Medal Brand Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s Yellow Leaf Tobacco Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s N. C. Farmers' Alli- ance Official Guano.....	8.00	2.06	3.00
Durham Fertilizer Co.'s Pride of Durham To- bacco Grower	8.00	2.06	3.00
Durham Fertilizer Co.'s Raw Bone Superphos- phate for Tobacco.....	8.00	2.06	2.00
Durham Fertilizer Co.'s Raw Bone Superphos- phate	8.00	2.06	1.50
Durham Fertilizer Co.'s Genuine Bone and Pe- ruvian Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Progressive Farmer Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Carr's Special Wheat Grower	8.00	....	4.00
Durham Fertilizer Co.'s Best Potato Manure.	7.00	5.76	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Lynchburg Guano Co.'s Ironside Acid Phosphate	16.00	....	....
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate.....	14.00	....	....
Lynchburg Guano Co.'s Arvonja Acid Phosphate	13.00	....	....
Lynchburg Guano Co.'s Spartan Acid Phosphate	12.00	....	....
Lynchburg Guano Co.'s Alpine Mixture.....	10.00	....	5.00
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture.....	10.00	....	4.00
Lynchburg Guano Co.'s Dissolved Bone and Potash	10.00	....	2.00
Lynchburg Guano Co.'s Independent Standard.	8.50	1.65	2.00
Lynchburg Guano Co.'s Bright Belt Guano...	8.00	2.47	3.00
Lynchburg Guano Co.'s Solid Gold Tobacco...	8.00	2.26	4.00
Lynchburg Guano Co.'s New Era.....	8.00	1.65	3.00
Lynchburg Guano Co.'s Lynchburg Soluble...	8.00	1.65	2.00
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Reliable Acid Phosphate.....	14.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Best Acid Phosphate.....	13.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Soluble Bone	12.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Bone and Potash	10.00	....	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Trucker and Tomato Grower.....	8.00	4.12	5.00
Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Amazon H. G. Special Tobacco Guano.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Cooper's Bright Tobacco Fertilizer.....	8.00	2.06	3.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Made Especially for Tobacco	8.00	2.06	2.00
Norfolk and Carolina Chemical Co.'s Peanut Grower	8.00	1.00	4.00
Norfolk and Carolina Chemical Co.'s Crescent Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s High Grade Acid Phosphate	14.00	....	....
Old Dominion Guano Co.'s Bone Phosphate...	13.00	....	....
Old Dominion Guano Co.'s Royster's Acid Phosphate	12.00	....	....
Old Dominion Guano Co.'s Obelisk Brand Bone and Potash.....	10.00	....	4.00
Old Dominion Guano Co.'s Planter's Bone and Potash Mixture.....	10.00	....	3.00
Old Dominion Guano Co.'s Old Dominion Alkaline Bone and Potash.....	10.00	....	2.00
Old Dominion Guano Co.'s Horne's Cotton Fertilizer	9.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano	9.00	1.65	1.00
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer	8.00	2.47	3.00
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer	8.00	2.47	3.00
Old Dominion Guano Co.'s Osceola Tobacco Guano	8.00	2.06	3.00
Old Dominion Guano Co.'s Farmers' Friend Fertilizer	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Guano	8.00	1.65	2.00
Old Dominion Guano Co.'s Bullock's Cotton Grower	8.00	1.65	2.00
Old Dominion Guano Co.'s Miller's Special Wheat Mixture	8.00	....	4.00
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	7.00	5.76	7.00
Old Dominion Guano Co.'s Old Dominion Potato Manure	7.00	4.12	8.00
Old Dominion Guano Co.'s 7 Per Cent Truck Fertilizer	6.00	5.76	6.00
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	6.00	5.76	5.00
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano	6.00	1.65	6.00
Old Dominion Guano Co.'s 10 Per Cent Truck Fertilizer	5.00	8.24	2.50
Powers, Gibbs & Co.'s Almont High Grade Acid Phosphate	14.00	....	....
Almont Acid Phosphate	12.00	....	....
Fulp's Acid Phosphate	13.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Best Acid Phosphate	13.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Acid Phosphate	12.00	....	....
Powers, Gibbs & Co.'s Acid Phosphate and Potash	10.50	....	1.50
Powers, Gibbs & Co.'s Almont Wheat Mixture	10.00	....	3.00
Powers, Gibbs & Co.'s Dissolved Bone and Potash	10.00	....	2.00
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano	9.00	2.47	2.00
Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano	8.00	3.29	5.00
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone	8.00	3.29	4.00
Powers, Gibbs & Co.'s Old Kentucky High Grade Manure	8.00	2.47	3.00
Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano	8.00	2.47	2.00
Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco	8.00	2.06	3.00
Powers, Gibbs & Co.'s Powers' Ammoniated Guano	8.00	2.06	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Powers, Gibbs & Co.'s Gibbs' Ammoniated Guano	8.00	2.06	1.50
Powers, Gibbs & Co.'s Almont Soluble Ammoniated Guano	8.00	1.65	2.00
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano.....	8.00	1.65	2.00
Powers, Gibbs & Co.'s Eagle Island Ammoniated	8.00	1.65	2.00
Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Red Cross 14 Per Cent Acid Phosphate	14.00	....	....
Southern Chemical Co.'s Victor Acid Phosphate	13.00	....	....
Southern Chemical Co.'s Chatham Acid Phosphate	13.00	....	....
Southern Chemical Co.'s Reaper Grain Application	12.00	....	3.00
Southern Chemical Co.'s Tar Heel Acid Phosphate	12.00	....	....
Southern Chemical Co.'s Horseshoe Acid Phosphate	12.00	....	....
Southern Chemical Co.'s Quickstep Bone and Potash	11.00	....	5.00
Southern Chemical Co.'s Solid South.....	10.00	....	6.00
Southern Chemical Co.'s Winner Grain Mixture	10.00	....	4.00
Southern Chemical Co.'s Farmers' Pride Bone and Potash	10.00	....	3.00
Southern Chemical Co.'s Winston Bone and Potash Compound	10.00	....	2.00
Southern Chemical Co.'s Mammoth Corn Grower	10.00	....	2.00
Southern Chemical Co.'s Mammoth Wheat and Grass Grower	10.00	....	2.00
Southern Chemical Co.'s Sun Brand Guano...	9.00	2.06	5.00
Southern Chemical Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8.00	2.47	2.50
Southern Chemical Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8.00	2.06	3.00
Southern Chemical Co.'s Electric Tobacco Guano	8.00	1.65	2.00
Southern Chemical Co.'s Electric Standard Guano	8.00	1.65	2.00
Southern Chemical Co.'s Yadkin Complete Fertilizer	8.00	1.65	2.00
Southern Chemical Co.'s Chick's Special Wheat Compound	8.00	....	4.00
J. G. Tinsley & Co.'s Powhatan Acid Phosphate	14.00	....	....
J. G. Tinsley & Co.'s Tinsley's Dissolved S. C. Bone	13.00	....	....
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate	12.00	....	....
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture	10.00	....	2.00
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer	8.00	3.29	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
J. G. Tinsley & Co.'s Richmond Brand Guano..	8.00	2.47	3.00
J. G. Tinsley & Co.'s Peanut Grower.....	8.00	1.00	4.00
J. G. Tinsley & Co.'s Killekinick Tobacco Mixture	8.00	2.06	3.00
J. G. Tinsley & Co.'s Lee Brand Guano.....	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Brand Guano.	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Tobacco Guano.	8.00	1.65	2.00
J. G. Tinsley & Co.'s Tinsley's Special Irish Potato Guano	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Am- moniated Guano for Beans, Peas, Cabbage, Strawberries, etc.	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's Irish Potato Guano	6.00	4.94	6.00
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower	6.00	3.29	4.00
J. G. Tinsley & Co.'s Tinsley's Top Dresser...	5.00	9.06	....
J. G. Tinsley & Co.'s Tinsley's 10 Per Cent Truck Guano	5.00	8.24	2.50
S. W. Travers & Co.'s Champion Acid Phos- phate	16.00	....	....
S. W. Travers & Co.'s Travers' Dissolved Acid Phosphate	14.00	....	....
S. W. Travers & Co.'s Standard Dissolved S. C. Bone	13.00	....	....
S. W. Travers & Co.'s Capital Dissolved Bone.	12.00	....	....
S. W. Travers & Co.'s Capital Bone and Pot- ash Compound	10.00	....	2.00
S. W. Travers & Co.'s Capital Truck Fer- tilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Capital Tobacco Fer- tilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Big Leaf Tobacco Grower	8.00	2.47	3.00
S. W. Travers & Co.'s Capital Cotton Fer- tilizer	8.00	2.06	2.00
S. W. Travers & Co.'s National Fertilizer.....	8.00	1.65	2.00
S. W. Travers & Co.'s National Special To- bacco Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Beef, Blood and Bone Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Peanut Grower.....	8.00	1.00	4.00
S. W. Travers & Co.'s Travers' Special Wheat Compound	8.00	....	4.00
S. W. Travers & Co.'s Travers' 7 Per Cent Truck Fertilizer	6.00	5.76	5.00
Virginia State Fertilizer Co.'s Bull Run Acid Phosphate	16.00	....	....
Virginia State Fertilizer Co.'s Gilt Edge Brand Acid Phosphate	14.00	....	....
Virginia State Fertilizer Co.'s Clipper Brand Acid Phosphate	13.00	....	....
Virginia State Fertilizer Co.'s Lurich Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Alps Brand Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Mountain Top Bone and Potash.....	10.00	....	5.00
Virginia State Fertilizer Co.'s XX Potash Mix- ture	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Virginia State Fertilizer Co.'s Virginia State Dissolved Bone and Potash.....	10.00	....	2.00
Virginia State Fertilizer Co.'s Number One Soluble Guano	9.00	1.65	2.00
Virginia State Fertilizer Co.'s Highland King.	9.00	1.65	1.00
Virginia State Fertilizer Co.'s Gamecock Spe- cial for Tobacco.....	8.50	1.65	2.00
Virginia State Fertilizer Co.'s Virginia State High Grade Tobacco Guano.....	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Bull Dog Solu- ble Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Dunnington's Special Formula for Tobacco.....	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Peerless To- bacco Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Buffalo Guano.	8.00	2.06	3.00
Virginia State Fertilizer Co.'s Austrian To- bacco Grower	8.00	2.06	2.00
Virginia State Fertilizer Co.'s Gilt Edge Spe- cial Tobacco Guano.....	8.00	2.06	2.00
Virginia State Fertilizer Co.'s Virginia State Guano	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Battle Axe To- bacco Guano	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.00	....	4.00
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Raw Bone Meal.....Total	21.73	4.10	....
<i>Williams & Clark Fertilizer Co., Charleston, S. C.—</i>			
Standard Americus Ammoniated Bone Super- phosphate	9.00	1.85	1.00
<i>Winborne-Brown Guano Co., Norfolk, Va.—</i>			
High Grade Acid Phosphate.....	16.00	....	....
Standard Acid Phosphate.....	14.00	....	....
Soluble Bone and Potash.....	10.00	....	2.00
Big Triumph Guano.....	8.00	3.30	4.00
Farmers Select Guano.....	8.00	2.47	4.00
King Taminy Guano.....	8.00	2.47	3.00
Winborne's Tobacco Guano.....	8.00	2.47	3.00
Winborne's Excelsior Guano.....	8.00	1.65	2.00
Standard Eureka Guano.....	8.00	1.65	2.00
Climax Peanut Guano.....	8.00	.82	4.00
High Grade Top Dresser.....	7.00	7.82	3.00
Big Crop 7 Per Cent Guano.....	5.00	5.75	5.00
Nitrate of Soda.....	....	15.65	....
Muriate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Wood's Pure Animal Bone.....Total	23.00	2.47	....
Standard H. G. Acid Phosphate.....	16.00	....	....
Standard High Grade Acid Phosphate.....	14.00	....	....
Standard Bone and Potash Mixture.....	10.00	....	2.00
Standard Corn Fertilizer.....	9.00	1.23	1.00
Standard Wheat Fertilizer.....	9.00	1.23	1.00
Standard Crop Grower Fertilizer.....	9.00	1.03	2.00

Name and Address of Manufacturer and Name of Brand	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard High Grade Trucker Fertilizer.....	8.00	1.93	6.00
Standard Vegetable Fertilizer.....	8.00	2.47	3.00
Standard Potato Fertilizer.....	8.00	1.65	5.00
Standard Grain and Grass Fertilizer.....	8.00	1.65	2.00
Wood's Lawn Enricher.....	6.00	2.47	3.00
Nitrate of Soda.....	....	15.63	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
<i>Wessell, Dural & Co., New York, N. Y.—</i>			
Nitrate of Soda.....	....	14.85	....
<i>Wilson Chemical Co., Wilson, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
East Carolina Tobacco Grower.....	8.00	2.47	3.00
Brag Cotton Grower.....	8.00	2.05	3.00
McGee's Potato Special.....	6.00	3.30	8.00
<i>The J. R. Young Fertilizer Co., Norfolk, Va.—</i>			
High Grade 16 Per Cent Acid Phosphate.....	16.00	....	....
J. R. Young 2 $\frac{1}{2}$ -9-2 Special Guano.....	9.00	2.26	2.00
J. R. Young's 4-8-4 Crop Grower.....	8.00	3.29	4.00
J. R. Young's New Process 3-8-3 Guano for Tobacco	8.00	2.47	3.00
J. R. Young's New Process 2-8-2 Guano for Cotton, Corn and Peanuts.....	8.00	1.65	2.00
Pasquotank 5-6-7 Potato Grower.....	6.00	4.11	7.00
J. R. Young's Special Guano for Potatoes....	6.00	4.11	5.00
J. R. Young's New Process Grower.....	5.00	5.76	3.50
J. R. Young's 3-6-6 Special Guano for S. P....	6.00	2.47	6.00
J. R. Young's 4-4-6 Special for Tobacco.....	4.00	3.29	6.00

LEAF TOBACCO SALES FOR DECEMBER. 1910.

Pounds sold for producers, first hand.....	14,373,802
Pounds sold for dealers.....	359,006
Pounds resold for warehouses.....	1,032,506
Total.....	15,765,314

Supplement to January Bulletin, 1911

North Carolina Department of Agriculture

CONDIMENTAL FEEDS, STOCK AND POULTRY TONICS AND CONDITIONERS

SENT FREE TO CITIZENS ON APPLICATION

Entered at the Post-office at Raleigh, N. C., as Second-class matter February 7, 1901, under Act of June 6, 1900.

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 R. W. COLLETT, Superintendent Transylvania and Buncombe Test Farms.
 Swannanoa, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, N. C., January 15, 1911.

SIR:—I submit herewith manuscript covering the inspection and examination of condimental, patented, proprietary and trade marked stock and poultry tonics, regulators and conditioners, prepared by G. M. MacNider, in accordance with the law passed by the General Assembly of 1909, regulating the registration and sale of these products in the State.

I recommend its publication as Supplemental to the January Bulletin.

Very respectfully,

B. W. KILGORE,
State Chemist.

TO HON. WILLIAM A. GRAHAM,
Commissioner of Agriculture.

CONDIMENTAL FEEDS, STOCK AND POULTRY TONICS AND CONDITIONERS

BY G. M. MACNIDER, Feed Chemist and Microscopist.

For many years a large variety of condimental feeds, condition powders, tonics, etc., for both cattle and poultry have been offered for sale in this State. While some of these remedies do possess medicinal value a very large number of them are of doubtful value for either stock or poultry. A few of these remedies are sold under the name of stock or poultry foods, but most of them are sold as tonics or conditioners and none of them make any claims as to their feeding value, and therefore they do not come under the law regulating commercial feeds. As it was known that a large amount of money was spent annually by the feeders of the State for these preparations and in many cases the claims made by the manufacturers of these preparations were misleading and fraudulent, the General Assembly of 1909 passed the following law regulating the sale of these tonics and conditions.

The text of the law is as follows:

AN ACT TO REGULATE THE REGISTRATION AND SALE OF CONDIMENTAL, PATENTED, PROPRIETARY OR TRADE-MARKED STOCK OR POULTRY TONICS, REGULATORS OR CONDITIONERS.

The General Assembly of North Carolina do enact:

SECTION 1. That before any condimental, patented, proprietary or trade-marked "stock or poultry tonic," "stock or poultry regulator," "stock or poultry conditioner," or any similar preparation, regardless of the specific name or title under which it is sold, which is represented as containing "tonic," "remedial" or other "medicinal" properties, either is sold, offered or exposed for sale in the State, the manufacturer, importer, dealer, agent or person who causes it to be sold or offered for sale, by sample or otherwise, within this State shall file with the Commissioner of Agriculture a statement that he desires to offer such "stock or poultry tonic," "stock or poultry regulator," "stock or poultry conditioner" or similar preparation for sale in this State, and also a certificate, the execution of which shall be sworn to before a notary public or other proper official, for registration, stating the name of the manufacturer, the location of the principal office of the manufacturer, and the name, brand or trade-mark under which the said preparation or preparations will be sold, together with the guaranty that said preparation or preparations are not injurious to the health of domestic animals and that they do not conflict with the drug requirements of the North Carolina Food and Drug Act, and that the name or trade-mark under which the article is sold shall not mislead or deceive the purchaser in any way; also, that any statement, design or devise on the label or package regarding the substances contained therein shall be true and correct, and any claim made for the feeding, condimental, tonic or medicinal value shall not be false or misleading in any particular, and file with the Commissioner of Agriculture a labeled package of each brand of goods, showing claims made for same, which labeling and claims shall not be changed during the fiscal year for which registration is made without the consent of the Commissioner of Agriculture.

SEC. 2. For the expense incurred in registering, inspecting and analyzing "stock or poultry tonics," "stock or poultry regulators," "stock or poultry condi-

tioners" and similar preparations defined in section one a registration fee of twenty dollars (\$20) for each separate brand shall be paid by the manufacturers or sellers of same to the Commissioner of Agriculture during the month of July, one thousand nine hundred and nine, and during the month of January in each succeeding year, said fees to be used by the Commissioner of Agriculture for executing the provisions of this act.

SEC. 3. Any person, company, corporation or agent that shall offer for sale or expose for sale any package or sample or any quantity of any condimental, patented, proprietary or trade-marked "stock or poultry tonic," "stock or poultry regulator," "stock or poultry conditioner," or any similar preparation, regardless of the title under which it is sold, which has not been registered as required by section one of this act, or which may have been registered, but subsequently found by an analysis or examination made by or under the direction of the Commissioner of Agriculture to violate any of the provisions of this act, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined in the sum of fifty dollars (\$50) for the first offense and in the sum of one hundred dollars (\$100) for each subsequent offense.

SEC. 4. Whenever the Commissioner of Agriculture becomes cognizant of any violation of any of the provisions of this act he shall immediately notify, in writing, the manufacturer, importer, jobber or dealer, if same be known. Any party so notified shall be given an opportunity to be heard, under such rules and regulations as may be prescribed by the Commissioner and the Board of Agriculture; and if it appears that any of the provisions of this act have been violated the Commissioner of Agriculture shall certify the facts to the solicitor in the district in which said sample was obtained, and furnish that officer with a copy of the result of the analysis or other examinations of the said article, duly authenticated by the analyst or other officer making such examination under the oath of such officer. In all prosecutions arising under this act the certificate of the analyst or other officer making the analysis or examination, when duly sworn to by such officer, shall be *prima facie* evidence of the fact or facts therein certified.

SEC. 5. That it shall be the duty of every solicitor to whom the Commissioner of Agriculture shall report any violation of this act to cause proceedings to be commenced and prosecuted without delay for the fines and penalties in such cases prescribed.

SEC. 6. This act does not repeal any part of any concentrated commercial feeding-stuff law which may be in effect in this State, but is designed to fully cover all preparations commonly known as condimental, patented, proprietary or trade-marked "stock or poultry tonics," "stock or poultry regulators," "stock or poultry conditioners," and all similar preparations used for "tonic," "regulative" or "condition" purposes, and to protect the public from deception and fraud in the sale of these specific products.

SEC. 7. This act shall be in force on and after July first, one thousand nine hundred and nine.

Ratified this the 3d day of March, A. D. 1909.

Requirements of the Law.

The law requires that all of these preparations claiming to have tonic, remedial or medicinal properties shall be registered annually with the Commissioner of Agriculture, the registration to be accompanied by a guarantee that the preparation is not injurious to the health of domestic animals.

The law requires that the manufacturer or person offering these preparations for sale shall pay annually a registration fee of twenty dollars (\$20) for each brand offered for sale in the State.

When the examination of any brand of tonic or conditioner shows that it is in violation of the law the manufacturer or dealer shall be

notified and given an opportunity to be heard under the rules prescribed by the Commissioner and Board of Agriculture.

When any manufacturer or dealer is found guilty and convicted of violating any of the provisions of this law he shall be fined fifty dollars (\$50) for the first offense and one hundred dollars (\$100) for each subsequent offense.

The object of the law as stated in section 6 is "to protect the public from deception and fraud in the sale of these specific products."

During the year 1910 there were registered with this Department sixty-three brands of these conditioners and tonics. Of this number forty were preparations claiming to be of medicinal value for stock, eighteen were for poultry and five were preparations claiming to be of value for stock and poultry.

General Character of the Preparations Covered by This Law.

The preparations which are required to register under this law are usually sold under a trade name as Stock Powders, Stock Tonics and Conditioners, Poultry Powders, Laying Foods, etc. With few exceptions these powders are composed of some concentrated feed as a base material, such as wheat bran, middlings, oil meal, cotton-seed meal, corn meal, etc., to which are added various powdered vegetable and mineral drugs. Some of the drugs found in these powders are frequently used in veterinary medicine, while others have practically no medicinal value. In many of these preparations common salt, sulphur or charcoal are the chief ingredients which could be of value. and very elaborate claims are made for these simple remedies. These subjects will be taken up in detail later. A few of the preparations do not use a base material to give bulk to the package, but simply mix together the ingredients of the tonic or conditioner. These are usually in much smaller packages than the ones using a filler and sell for about the same price as the larger and more elaborately decorated packages.

In the following table are presented the name and manufacturer of the preparations examined in preparing this report, together with the name of the retail dealer selling the preparation and the weight and price of each package.

STOCK FOODS, TONICS AND CONDITIONERS.

Laboratory Number.	Brand Name From Label.	Manufacturer or Wholesaler.	Retail Dealer.	Weight of Package—lbs.	Price—cents.
2 A	Dr. Petty's Natural Stock Lick	The Lick Co., Winston-Salem, N. C.	F. V. Johnston, Greenville.....	2.0	---
3 A	Dr. Hess Stock Food.....	Drs. Hess and Clark, Ashland, Ohio.	Kinston Peanut Co., Kinston..	2.4	25
4 A	Wayne County Stock Powder..	J. B. Roberts, Goldsboro, N. C.	Pittman & Best, Goldsboro	1.3	25
5 A	*Rust's Havens Climax Powder	Wm. Rust & Sons, New Brunswick, N. J.	Sent by manufacturer.....	0.8	25
7 A	Earl A. Sloan's Horse Powders.	Dr. Earl A. Sloan, Boston, Mass.	E. B. Marston Drug Co., Kinston.	1.1	25
8 A	Mexican Stock Powder.....	Goldsboro Drug Co., Goldsboro, N. C.	City Pharmacy, Goldsboro....	1.0	15
9 A	Blue Ribbon Medicated Stock Food.	Imperial Chemical Co., Greensboro, N. C.	C. P. Farmer Co., Wilson.....	1.7	---
10 A	American Horse Powder.....	American Stock Food Co., Fremont, Ohio.	F. B. Phillips, Raleigh.....	1.0	50
12 A	Fairfield's Blood Tonic and Milk Producee.	Fairfield Manufacturing Co., Philadelphia, Penn.	Sent by manufacturer.....	3.9	50
14 A	Dr. F. E. White's Worm and Condition Powders.	F. E. White, Norfolk, Va.....	E. B. Marston Drug Co., Kinston.		
18 A	International Stock Food.....	International Stock Food Co., Minneapolis, Minn.	Hunter & Dunn, Raleigh	1.8	25
21 A	Prussian Stock Tonic.....	Prussian Remedy Co., St. Paul, Minn.	Job P. Wyatt & Sons, Raleigh.	1.5	25
24 A	Prussian Condition Powder.....	do.....	do.....	0.8	25
28 A	Pratt's Animal Regulator.....	Pratt Food Co., Philadelphia, Penn.	do.....	1.6	25
40 A	Pratt's Conditioner.....	do.....	do.....	12.0	75
50 A	Pratt's Cow Tonic.....	do.....	J. F. McNair, Laurinburg.....	2.1	50
50 A	Seneca Horse Condition Powder.	Seneca Chemical and Stock Food Co., Tiffin, Ohio.	W. A. Myatt, Raleigh.....	1.8	25
32 A	Stocktone.....	Dr. Joseph Haas Remedy Co., Indianapolis, Ind.	Job. P. Wyatt & Sons, Raleigh.	2.1	50
33 A	Dr. Joseph Haas Hog Remedy.	do.....	do.....	1.7	75
34 A	Capital Animal Regulator.....	The Capital Food Co., Tiffin, Ohio.	F. B. Phillips, Raleigh.....	6.6	50
35 A	Capital Stock Remedy.....	do.....	do.....	1.8	25
37 A	Black-Draught Stock Medicine.	Black-Draught Stock Medicine Co., Chattanooga, Tenn.	do.....	0.4	25
38 A	*W. H. King's Celebrated Powders.	W. H. King Drug Co., Raleigh, N. C.	Manufacturer.....	1.1	25
39 A	*Barker's Vegetable, Horse, Cattle and Poultry Powder.	Barker, Moore and Mein Medicine Co., Philadelphia, Pa.	W. H. King Drug Co., Raleigh.	0.8	20
42 A	Dr. C. A. Daniels' Cow Invigorator.	Dr. C. A. Daniels, Boston, Mass.	Sent by manufacturer.....		
45 A	Justus' Horse and Cattle Alternative and Tonic Powders.	W. H. Justus, Hendersonville, N. C.	Sent by manufacturer.....	1.3	---
46 A	Fairfield's Blood Tonic, for Horses Only.	Fairfield Manufacturing Co., Philadelphia, Penn.	Sent by manufacturer.....	3.9	50
47 A	Fairfield's Blood Tonic, for Hogs Only.	do.....	do.....	3.9	50
48 A	Blackman's Medicated Salt Brick.	Blackman Stock Remedy Co., Chattanooga, Tenn.	J. F. Powers & Son, Fayetteville.	3.6	25
51 A	*Kentucky Condition Powder.	Burwell & Dunn, Charlotte, N. C.	G. C. Clark, Laurinburg	0.9	25
53 A	Jockey Animal Food.....	McCormick & Co., Baltimore, Md.	H. Hammond, Laurinburg	1.1	---
54 A	Royster's Stock Food Compound.	Southern Stock Food Co., Oxford, N. C.	G. L. Gidden, Dunn.....	1.5	25
55 A	Red Cross Cow Remedy.....	The Seneca Co., Tiffin, Ohio..	Surles & Co., Dunn.....	1.4	50
56 A	*Lightning Horse, Cattle and Poultry Powders.	Herb Medicine Co., Springfield, Ohio.	Taylor & Co., Dunn.....	0.6	10
57 A	Grainger's Tonic Stock Medicine.	Grainger Medicine Co., Chattanooga, Tenn.	Jas. Pearsall, Dunn.....	2.2	25
58 A	Ramon's American Stock Powders.	Brown Manufacturing Co., Greenville, Tenn.	T. B. Hunter Drug Co., Rockingham.	0.8	---
59 A	Ashland Stock Food.....	Ashland Stock Food Co., Ashland, Ohio.	McNair & Stagner, Rockingham.	2.7	25
61 A	Ashcraft's Cattle Powder.....	J. B. Ashcraft's Sons, Monroe, N. C.	Parsons Drug Co., Wadesboro.	0.8	---

STOCK FOODS, TONICS AND CONDITIONERS—*Continued.*

Laboratory Number.	Brand Name From Label.	Manufacturer or Wholesaler.	Retail Dealer.	Weight of Package—lbs.	Price—cents.
62 A	Dr. LeGear's Stock Powders...	Dr. LeGear Co., St. Louis, Mo.	W. C. Buff, Lincolnton...	1.8	...
63 A	Stonecypher Horse and Cattle Tonic.	Stonecypher Horse and Cattle Tonic Co., Westminster, S. C.	C. V. Harden, Rutherfordton...	1.4	...
65 A	Bigler's Condition Powders...	G. R. Bigler Co., Springfield, Ill.	Mullis & Co., Charlotte...	1.8	...
66 A	Wright's Horse and Cattle Powders.	Lake Shore Seed Co., Dunkirk, N. Y.	M. L. Flow, Monroe...	1.1	...
67 A	Great Magle Condition Powders.	Samuel Sutton, Baltimore, Md.	Rhyne Bros., Charlotte.	...	...
68 A	Speedway Stock Food.....	Interstate Chemical Co., Baltimore, Md.	D. L. Cauble, Salisbury...	0.8	...
70 A	Magle Stock Tonic.....	Magle Food Co., Chattanooga, Tenn.	Ellis & Co., Wilson...	2.1	...

POULTRY FOODS, TONICS AND CONDITIONERS.

1 A	Dr. Petty's Premium Poultry Powder.	The Lick Co., Winston-Salem, N. C.	F. V. Johnston, Greenville...	1.5	...
11 A	American Poultry Food.....	American Stock Food Co., Fremont, Ohio.	F. B. Phillips, Raleigh...	1.6	25
13 A	Fairfield's Blood Tonic and Egg Producer.	Fairfield Manufacturing Co., Philadelphia, Penn.	Sent by Manufacturer.....	3.8	50
15 A	Conkey's Laying Tonic.....	G. E. Conkey Co., Cleveland, Ohio.	F. B. Phillips, Raleigh...	3.6	50
16 A	Conkey's Poultry Tonic.....	do.	do.....	0.5	25
17 A	International Poultry Food.....	International Stock Food Co., Minneapolis, Minn.	Hunter & Dunn, Raleigh...	1.6	25
22 A	Prussian Poultry Tonic.....	Prussian Remedy Co., St. Paul, Minn.	Job P. Wyatt & Sons, Raleigh,	1.5	25
27 A	Pratt's Poultry Regulator.....	Pratt Food Co., Philadelphia, Penn.	do.....	1.8	25
31 A	Seneca Poultry Powder.....	Seneca Chemical and Stock Food Co., Tiffin, Ohio.	W. A. Myatt, Raleigh.....	1.8	25
36 A	Capital Poultry Remedy.....	The Capital Food Co., Tiffin, Ohio.	F. B. Phillips, Raleigh...	2.1	25
44 A	Dr. LeGear's Poultry Powder..	Dr. D. LeGear Co., St. Louis, Mo.	Sent by manufacturer.....	1.6	25
49 A	Dr. Hess Poultry Panacea.....	Drs. Hess and Clark, Ashland, Ohio.	J. F. Powers & Son, Fayetteville.	1.4	25
52 A	Uncle Sams Chicken Powder...	McCormick & Co., Baltimore, Md.	G. W. Goodwin, Laurinburg...	0.5	...
60 A	Knauff's Royal Poultry Food ..	Tennessee Medicine Co., Knoxville, Tenn.	W. N. Jeans, Wadesboro.....	1.6	...
64 A	Bigler's Poultry Compound ...	G. R. Bigler Co., Springfield, Ill.	Mullis & Co., Charlotte...	2.2	...
69 A	McNair's Chicken Powder.....	W. H. McNair, Tarboro, N. C.	May & Gorham, Rocky Mount.	0.5	...
71 A	Magle Poultry Tonic.....	Magle Food Co., Chattanooga, Tenn.	S. B. Lancaster & Sons, Rocky Mount.	2.1	...
73 A	Full Nest Egg Food.....	Cyphers Incubator Co., Buffalo, N. Y.	S. R. McEachern & Sons, Wilmington.	...	...
74 A	Royster's Poultry Food.....	Southern Stock Food Co., Oxford, N. C.	Miller & Wetmur, Hendersonville.	...	25

As will be seen from this table, some of the manufacturers put up a large package weighing several pounds for the same price that other manufacturers put up a small package. The material in the large packages consists principally of the base material, linseed meal, etc., and the size of the package, no doubt, frequently leads the purchaser to believe that he is getting a larger amount of valuable medicine by buying a brand in a large package instead of one in a small package, whereas, in reality he is paying an extremely high price for a package of concentrated feed which he usually buys by the ton.

Feeding Value of Preparations Sold Under the Name of Stock and Poultry Foods.

While the majority of the preparations examined are sold under the name of tonics, conditioners, etc., and not as feeds or foods, and none of them make any claim as to the feeding value of the preparation, still a few of them are sold under the name of stock and poultry foods. In the following table are presented the feed analyses of several of these preparations.

FEED ANALYSIS OF STOCK AND POULTRY FOODS.

Laboratory Number.	Brand Name From Label.	Manufacturer or Wholesaler.	Analysis.					
			Protein. (Nx 6.25)	Fat. (Ether Extract)	Fiber.	Nitrogen— Free Extract.	Moisture.	Ash.
3	Dr. Hess Stock Food.....	Drs. Hess and Clark, Ashland, Ohio.	10.88	2.26	5.45	71.04	6.12	4.25
9	Blue Ribbon Medicated Stock Food.	Imperial Chemical Co., Greens- boro, N. C.	10.13	1.34	2.65	71.29	3.33	11.26
11	American Poultry Food.....	American Stock Food Co., Fremont, Ohio.	11.63	3.81	5.07	29.70	4.68	45.11
17	International Poultry Food....	International Stock Food Co., Minneapolis, Minn.	13.88	2.93	15.34	46.35	6.95	46.35
18	International Stock Food.....	do.....	10.50	5.55	10.80	48.41	6.42	18.32

It will be seen from these analyses that none of these preparations are as valuable from a feed standpoint as the average mill product.

Comparing the composition and price of No. 3, with wheat bran, its base material, it is seen that wheat bran containing protein 15.38 per cent, fat 4.63 per cent, and fiber 8.30 per cent, sells for \$1.50 per one hundred pounds, while No. 3 containing protein 10.88 per cent, fat 2.26 per cent, and fiber 5.45 per cent, sells for \$10.40 per one hundred pounds. In other words No. 3 is not as nutritious as wheat bran but sells for nearly seven times as much as wheat bran.

Comparing No. 11 with linseed meal, its base material, it is seen that linseed meal containing protein 33.87 per cent, fat 6.08 per cent, and fiber 7.29 per cent, sells for \$2.75 per one hundred pounds, while No. 11 containing protein 11.63 per cent, fat 3.81 per cent, and fiber 5.07 per cent, sells for \$15.60 per one hundred pounds. Linseed meal contains more than twice as much protein as No. 11, but No. 11 sells for more than six times as much as linseed meal.

These figures are sufficient to show that both from point of feeding value and from point of price these preparations are not to be considered as foods for either stock or poultry.

The excessive prices charged for these preparations are, according to the manufacturers, not for their feeding value, but for the medical value which they possess. The analyses show that they are composed largely of the base materials, wheat bran, linseed meal, etc., and the drugs for which such extensive claims are made compose

only a small amount of the preparation. As will be seen in another part of this bulletin the drugs used which have medicinal value are usually the simple remedies which are in use by most stockmen and which sell for a few cents per pound. The consumer is then paying an enormously high price for a poor feed with a small amount of cheap drugs added to it.

*Materials Used in Condimental Feeds and Tonics.*¹

In the following list are given the principal drugs used in the tonics and conditioners together with their use in veterinary medicine.

Vegetable Drugs.

Fenugreek—It is of very little use, but is a mild tonic, stomachic, carminative and aids digestion.

Gentian—Tonic and stomachic.

Fennel—Condiment, very little medical use.

Ginger—Stomachic and carminative.

Tumeric—Aromatic stimulant, used for jaundice.

Anise—Aromatic carminative, and is supposed to increase milk secretion and is used for flatulent colic.

Senna—Not used in veterinary medicine.

Asafoetida—Appetizer, stomachic, stimulant, expectorant, nerve stimulant, antispasmodic, and is used in flatulent colic.

Black pepper—Stomachic, carminative, and is used for flatulent colic.

Cayenne pepper—Same uses as black pepper.

Elecampane root—Unimportant, used as stomachic.

Blood root—Emetic, stimulant, narcotic, expectorant and emmenagogue.

Juniper berries—Diuretic, seldom used. Gentle stimulant.

Licorice root—Demulcent and slight laxative.

Coriander—Condiment, feeble aromatic.

Valerian—Purgative.

Lobelia—Antispasmodic.

Mandrake root—Cathartic.

Sage—Condiment, tonic, stimulant, astringent.

Oak bark—Astringent.

Bay berry—Tonic and stimulant.

Poplar bark—Not used in veterinary medicine.

Walnut bark—Astringent.

Mustard—Externally an irritant, internally an emetic.

Cinchona bark—Tonic and febrifuge.

¹ The list showing the use of these drugs in veterinary medicine was very kindly prepared for the author by Dr. W. G. Chrisman and Dr. E. P. Wood, of the Veterinary Division of this Department.

Columbo root—Tonic and stomachic.

Sassafras—Used externally, aromatic, stimulant and astringent.

Urra ursi leaves—Astringent and tonic, also used for all kidney and bladder diseases.

Belladonna root—Tonic, alterative, anodyne and antispasmodic.

Nux vomica—Tonic and nerve stimulant.

Quassia—Tonic and vermicide.

Pythollaca root (poke root)—Emetic, purgative and narcotic.

Pulsatilla—Irritant.

Camphor—Alterative, tonic, anodyne, expectorant and antispasmodic.

*Mineral Drugs.*¹

Common salt—Alterative, antiseptic, with warm water emetic.

Glauber's salt—Mild purgative.

Epsom salts—Purgative.

Sodium bicarbonate—Alterative, antacid.

Calcium carbonate—Alterative, antacid.

Salt peter—Alterative, diuretic, febrifuge.

Copperas—Alterative, blood tonic.

Iron oxide—Coloring matter, not used in veterinary medicine.

Antimony, black—Alterative, diaphoretic.

Alum—Astringent.

Rosin—Diuretic, tonic.

Charcoal—Absorbent.

Sulphur—Tonic, alterative.

Sodium hyposulphite—Alterative, used in blood poison.

The following list includes the feeds commonly used as base materials or diluents.

Wheat bran.

Wheat middlings.

Gluten feed.

Corn meal.

Linseed meal.

Cotton-seed meal.

Cotton-seed hulls.

Malt sprouts.

Buckwheat hulls.

Screenings.

Miscellaneous Materials.

Ground bone.

Limestone.

Oyster shells.

Dried blood.

Lime.

As will be seen from the above list a number of the drugs which are used to a large extent in these preparations have very little medicinal effect. Comparatively few of the drugs in the list are used to any extent in veterinary medicine.

Claims of Manufacturers.

When it is remembered that with most of these tonics the base material, wheat bran, etc., constitutes the greater portion of the tonic, and the small amount of drugs present can have but little effect when given in the doses prescribed by the manufacturers, it is interesting to note a few of the elaborate claims made for these preparations.

****Stock Food** is recommended for Horses, Cattle, Hogs and Sheep. For horses it increases the appetite and improves digestion. A remedy for epizooty, coughs, distemper, dropsy and all blood disorders. It gives life, vigor and energy, removes worms and produces a fine, smooth and glossy coat, and is a wonderful flesh producer.

Give two tablespoonfuls morning and evening.

This food is composed of wheat bran, fenugreek, charcoal, pepper, copperas 2.71 per cent, and common salt 25.38 per cent.

****Stock Food.** A guaranteed remedy for horses and cattle. Compounded from purely vegetable ingredients remarkable for their medicinal qualities. It claims to be a remedy for many of the diseases of horses and cattle and makes a wonderful improvement in their general condition.

This remedy is composed of 73 per cent of cotton seed hulls, small amounts of fenugreek and gentian and 1.88 per cent sulphur.

****Poultry Powder** is a valuable remedy for Cholera, Roup, Gaps and all diseases of poultry and for increasing egg production.

This powder is composed of linseed meal, fenugreek, charcoal, sulphur 3.58 per cent, iron oxide 2.41 per cent, epsom salts 2.45 per cent, and calcium carbonate 26.95 per cent.

****Stock Powder** "cures diseases, prevents diseases, and keeps stock healthy." It is an excellent tonic and appetizer. A first-class condition powder and animal regulator for all domestic animals. An excellent remedy for coughs, colds, pinkeye, distemper, epizootic, hide bound, loss of flesh and all kindred ailments of horses, cattle, hogs and sheep.

This remedy is composed of wheat bran, ginger, charcoal, common salt 14.35 per cent and sulphur.

These illustrations are typical of the claims usually made by the manufacturers. Practically all of them claim to cure a wide range of diseases, and in addition to keep the animal in good health. The analyses show them to be composed largely of some base material with a few powdered drugs added which have very little use in veterinary medicine and varying amounts of salt, sulphur and charcoal. The directions usually state to use from one to three tablespoonfuls of the

remedy two or three times a day. At this rate the animal will receive only a very minute quantity of the drugs in the remedy. In veterinary practice the prescribed doses of these drugs are from five to ten times greater than could be obtained by following the manufacturers' directions. It is difficult to imagine that such a method of treatment could be effective in curing any one of the diseases mentioned, not to mention the wide range of diseases enumerated by the manufacturers.

Feeding Experiments Testing the Value of Condimental Feeds and Tonics.

As these condimental feeds and tonics met with a large sale in many parts of this country and abroad a number of experiment stations have conducted experiments to determine the actual value of these preparations for all kinds of animals and to prove or disprove the extensive claims made by the manufacturers for their remedies.

The following summary of experiments are abstracts from the reports of the stations where these experiments have been conducted.

Summary of Feeding Experiments with Condimental Feeds.

Lindsey at the Massachusetts Experiment Station,¹ tested the value of Pratt's Food with dairy cows in comparison with corn meal and wheat middlings. He concludes that Pratt's Food did not substantially increase the quantity of milk and milk ingredients over that produced by a like amount of ordinary feeds; that Pratt's Food failed to increase the richness of the milk; that the cost of milk and butter was increased fully 10 per cent when Pratt's Food was fed; that no effect favorable or otherwise upon the general health and condition of the animals was noted from the addition of Pratt's Food to the daily ration.

Kennedy and Marshall at the Iowa Experiment Station,² conducted an extensive series of feeding experiments with steers, using rations consisting of combinations of standard feeds alone and mixed with condimental stock foods to determine the value, if any, of condimental foods in fattening steers for market. In each case the profits obtained per steer were considerably less when a condimental food was included in a ration than when a straight ration was fed. The condimental foods tested were Iowa, International and Standard. Iowa Stock Food gave the best returns of any of the condimental foods, International standing second and Standard third.

The same investigators³ conducted feeding experiments to determine the value of several feeds when fed in conjunction with corn

¹Massachusetts Experiment Station Bulletin No. 196.

²Iowa Experiment Station Bulletin No. 66.

³Iowa Experiment Station Bulletin No. 65.

for economical production of pork. Standard Stock Food was used with other materials in balancing the ration. The authors conclude that while it is high in protein and ash it is little or no value in balancing the ration, due to the fact that it is fed in such small quantities.

Snyder at the Minnesota Experiment Station,⁴ in conducting feeding experiments with steers to determine the digestibility of alfalfa hay with other materials found that the addition of International Stock Food to the ration lowered the digestibility of the other materials to a marked degree.

Voelcker⁵ conducted a feeding experiment with steers using a ration composed of standard feeds. To one lot was added, in addition to the regular ration, one ounce per day per head of a mixture made up of licorice, anise seed, gentian, fenugreek, coriander, caraway, cummin, and ginger. In summarizing his results he says: "The result is clearly to show that no case can be made out from it for any of the virtues supposed to belong to spice and condimental foods, but that steers will fatten as well and as economically on a well chosen mixture of ordinary foods. Nor did it turn out that the use of condiments enabled the steers to consume more bulky food like straw, hay and chaff.

Experiments conducted at the Vermont Experiment Station⁶ by Hills, with Jersey cows fed a normal ration to which Nutriotone had been added showed that the lowest yields of milk and butter fat for any period were obtained when Nutriotone was fed.

A similar experiment conducted by Bartlett at the Maine Experiment Station,⁷ with Nutriotone showed that Nutriotone did not seem to have any effect, favorable or unfavorable.

Otis, at the Kansas Experiment Station,⁸ conducted feeding experiments with cows on a normal ration to determine the effect of using Acme Stock Food and Globe Stock Food. In each case there was a small gain in the butter fat produced by the lot being fed one of the condimental foods, but the additional cost necessary to produce this small gain is higher than the market price of butter. He concludes "The tests of these two stock foods indicate that they are worthless for dairy cows accustomed to a good balanced ration."

A practical experiment conducted by a dairy farmer to determine the value of stock foods is reported in Hoard's Dairyman.⁹ The stock food not only failed to increase the milk flow, but it failed utterly to arrest the falling off of the milk flow due to poorer quality of silage fed during the latter part of the experiment.

Eingerling at the Hohenheim Station, Germany,¹⁰ conducted an

⁴Minn. Experiment Station Bulletin No. 80.

⁵J. Royal Agr. Soc., England, 62 (1901) abstract by F. W. Woll in Bulletin 151, Wis., Agr. Exp. Stat.

⁶8th Annual Report Vermont Experiment Station.

⁷12th Annual Report Maine Experiment Station.

⁸Kansas Experiment Station Press Bulletin No. 88.

⁹Vol. 35, 1904 abstract by F. W. Woll in Wisconsin Experiment Bulletin No. 151.

¹⁰Landw. Vers. Sta. 62, J. 11-180. Abstract by F. W. Woll, Wis. Experiment Station Bulletin, 151.

extensive series of experiments to determine the influence of condimental foods on the milk secretion of sheep and goats. The animals experimented with were fed rations free from or low in stimulating materials and rations to which condiments like fennel, fenugreek, etc., were added. The experiments in which low-flavored rations were fed to a sheep and goat, gave results indicating that the condiments in this case may influence the composition of the milk. Fennel appeared to cause an increase in the yield and in the fat of the milk but fenugreek had apparently no effect on the milk secretion.

Sir John Lawes¹¹ tested Thorley's Stock Food with sheep, substituting it in part for the linseed meal and cotton-seed meal of the ration. "The results previously published of experiments with pigs taken together with those now recorded in regard to sheep, seem sufficiently conclusive against the assumption that the use of the so-called condiments increases the assimilation of food by fattening animals in a state of health. They are equally conclusive on the subject of the profit or loss to the feeder from the use of such substances. Whether or not the so-called condiments may prove advantageous in the cases of old, overworked, or otherwise debilitated horses, or to fattening animals or poor constitution, or of weakly digestive power, is quite another question. In some cases they will doubtless happen to be appropriate; but whether the beneficial results will be attained at a greater or less cost by having recourse to medicines in the ordinary way, or to the use of the so-called condiments, must be left to others to determine."

Clothier, at the Kansas Experiment Station,¹² conducted an experiment with sheep to determine the effect of a condimental food. Two lots of sheep were fed the same rations with the exception that one lot was fed in addition a condimental stock food. At the end of three weeks the lot which had received the straight ration was found to have gained 117 pounds more than the lot which had received the condimental food. "Both lots received all the corn and alfalfa hay they would eat, and if this condimental food were of any great value, the sheep receiving it should have gained the most."

Feeding experiments were conducted at the Ohio Experiment Station,¹³ to test the advisability of feeding to fattening range lambs cotton-seed meal, oil meal, or Dr. Hess' Stock Food with corn. In summarizing the results of the experiment the author states that the lot fed stock food made slightly greater gains than did any of the other lots. As to the difference in the gains in the different lots he states that they are so small that it can not be said that any of the rations possessed a decided superiority over any other.

Plumb at the Indiana Experiment Station,¹⁴ conducted two sets of

¹¹Rothamsted Memoirs, Vol. 2, abstract by J. P. Street, New Jersey Experiment Station Bull. No. 184
¹²Industrialist, 26, 1900, 34.

¹³Ohio Experiment Station Bulletin No. 179.

¹⁴Indiana Experiment Station Bulletin No. 93.

feeding experiments with pigs. In each experiment the pigs were divided into two lots and fed on a ration of shorts and hominy feed. In the first experiment a small amount of American Stock Food was added to the ration of one lot and in the second experiment Rauh's Stock Food was added to the ration of one lot. In the first experiment the lot fed American Stock Food made a less gain in pounds and at a greater cost per pound than the lot in which the condimental food was omitted. In the second experiment that lot fed Rauh's Stock Food made a slightly greater gain at a slightly less cost per pound than the lot in which the condimental food was omitted.

Brooks at the Massachusetts Experiment Station,¹⁵ conducted three experiments with poultry to determine the value of condimental foods. In summarizing the results of the experiments he states, "The differences have in every case been small. In favor of the condition powder we have one experiment, against it we have two experiments. It is not claimed that the powder is injurious, but simply not beneficial. In the light of these results, it is believed that poultry keepers throw away money expended for condition powders."

In summarizing his statements in regard to condimental foods, Henry¹⁶ states: "As to these nostrums it may be said that vigorous, healthy animals do not make better use of their feed because of their addition. If animals are out of condition they should receive specific treatment according to their ailments. A good manager of live stock will have no use for these high priced condimental foods or condition powders; a poor manager will never have fine stock by employing them."

A study of these abstracts, which give the results of careful and accurate practical work, affords an interesting comparison with the extensive claims made by the manufacturers. The experiments, as will be noted, cover a wide range, including dairy cows, steers, sheep, hogs and poultry. None of the experiments are in favor of the use of these tonics and conditioners. A few of them gave questionable results, but the majority of them were decidedly against the use of tonics and conditioners.

The value of these preparations is very well stated by Prof. Henry. "As to these nostrums it may be said that vigorous, healthy animals do not make better use of their feed because of their addition. If animals are out of condition they should receive specific treatment according to their ailments. A good manager of live stock will have no use for these high priced condimental foods or condition powders; a poor manager will never have fine stock by employing them."

¹⁵Massachusetts Experiment Station, Annual Report 1896. 10th Annual Report and 11th Annual Report.

¹⁶Feeds and Feeding, by W. A. Henry.

Analysis of Samples.

Each one of the samples reported in this bulletin was subjected to a chemical and microscopical analysis to determine as far as possible the ingredients of which they are composed.

Microscopical Analysis.

In the microscopical analysis the base material or diluent is first determined. This is usually a simple matter as the diluent is present in such large amount that its nature is evident without examination. The microscopical analysis is the only accurate means of detecting the vegetable drugs used in compounding these preparations. As has been seen from the list of drugs the number of vegetable drugs which may be used is very extensive, and consequently the accurate analysis requires a very detailed study of each sample, and an accurate knowledge of the histological structure of the medicinal plants which may be used. A great many of the drugs used possess certain histological characteristics which makes their identification positive. But, with some there is no characteristic element and consequently the identification can not be so positive. In all cases of identifying drugs the microscopic slide made from the sample has been compared with a slide made from a known powder of the drug in question, so as to verify each identification as completely as possible. It is not claimed that the microscopic analysis as reported in this bulletin includes all the drugs used in each preparation, for some of them are used in very minute quantities, but it is believed that each analysis is so complete that it includes all of the drugs present in sufficient amount to have any effect in the preparation.

Chemical Analysis.

Each one of the samples has been subjected to a complete qualitative analysis to determine the mineral ingredients present. In many cases the amount of salt, epsom salts, glauher's salt, iron oxide, etc., have been determined quantitatively. Sulphur, which is present in many of the preparations, has been determined quantitatively by the author's method.¹⁷ The preparations which are sold under the name of foods have been subjected to a complete feed analysis by the official methods of the Association of Official Agricultural Chemists. In determining the fat in the samples which contained sulphur the ether dissolved a considerable amount of the sulphur. This was determined quantitatively in the extract and the proper correction made.

On the following pages will be found the results of the chemical and microscopical analyses of the samples examined.

¹⁷J. Ind. and Eng. Chem., 3, 1, 1911.

Stock Foods, Tonics and Conditioners.

The Lick Co.,
Winston-Salem, N. C.

- 2 A Dr. Petty's Natural Stock Lick.

Weight of package, 2 lbs.

Base material:

Wheat middlings.

Drugs:

Fenugreek.

Charcoal.

Salt, 70.78 per cent.

Drs. Hess & Clark,
Ashland, Ohio.

- 3 A Dr. Hess Stock Food.

Weight of package, 2.4 lbs.; price, 25c.

Base material:

Wheat bran.

Drugs:

Fenugreek.

Charcoal.

Pepper.

Copperas (ferrous sulphate), 2.71 per cent.

Salt, 25.38 per cent.

J. B. Roberts,
Goldsboro, N. C.

- 4 A Wayne County Stock Powder.

Weight of package, 1.3 lbs.; price 25c.

Base material:

No vegetable ingredients.

Drugs:

Sulphur, 20.81 per cent.

Glauber's salt, 1.10 per cent.

Sodium bicarbonate, 15.20 per cent.

Salt, 39.24 per cent.

Sand and Silica, 2.12 per cent.

Wm. Rust & Sons,
New Brunswick, N. J.

- 5 A *Rust's Havens Climax Powder.

Weight of package, 0.8 lb.; price, 25c.

Base material:

Linseed meal:

Drugs:

Pepper.

Ginger.

Sulphur, 1.38 per cent.

Dr. Earl S. Sloan,

Boston, Mass.

7 A Earl S. Sloan's Horse Powders.

Weight of package, 1.1 lbs.; price, 25c.

Base material:

Linseed meal.

Drugs:

Fennugreek.

Ginger.

Licorice.

Charcoal.

Salt, 2.37 per cent.

Sulphur, 7.31 per cent.

Goldsboro Drug Co.,

Goldsboro, N. C.

8 A Mexican Stock Powder.

Weight of package, 1.0 lb.; price, 15c.

Base material:

Cotton-seed meal.

Drugs:

Fennugreek.

Ginger.

Salt, 4.88 per cent.

Sulphur, 11.15 per cent.

Saltpeter (potassium nitrate).

Nux vomica.

Imperial Chemical Co.,

Greensboro, N. C.

9 A Blue Ribbon Medicated Stock Food.

Weight of package, 1.7 lb.

Base material:

Wheat bran.

Drugs:

Charcoal.

Calcium carbonate, 7.95 per cent.

Copperas (ferrous sulphate), 3.46 per cent.

Salt, 22.05 per cent.

Saltpeter (potassium nitrate).

American Stock Food Co.,
Fremont, Ohio.

- 10 A American Horse Powder.
Weight of package, 1.0 lb.; price, 50c.

Base material:

Wheat middlings.

Linseed meal.

Drugs:

Cinchona bark.

Fenugreek.

Pepper.

Salt, 8.38 per cent.

Glauber's salt, 1.26 per cent.

Dr. F. E. White,
Norfolk, Va.

- 14 A Dr. F. E. White's Worm and Condition Powders.

Base material:

Wheat bran and middlings.

Drugs:

Gentian.

Charcoal.

Copperas (ferrous sulphate), 18.36 per cent.

Fairfield Manufacturing Co.,
Philadelphia, Pa.

- 12 A Fairfield's Blood Tonic and Milk Producer.

Weight of package, 3.9 lbs.; price, 50c.

Base material:

Wheat bran and middlings.

Drugs:

Fenugreek.

Licorice.

Gentian.

Salt, 30.32 per cent.

Epsom salts, 3.89 per cent.

Sodium bicarbonate, 10.85 per cent.

- 46 A Fairfield's Blood Tonic, for horses only.

Weight of package, 3.9 lbs.; price, 50c.

Base material:

Wheat bran and middlings.

Drugs:

Fenugreek.

Licorice.

Gentian.

Salt, 10.62 per cent.
Glauber's salt, 12.84 per cent.
Sodium bicarbonate, 24.05 per cent.

- 47 A Fairfield's Blood Tonic, for hogs only.
Weight of package, 3.9 lbs.; price, 50c.

Base material:

Wheat bran and middlings.
Ground bone.
Dried blood.
Corn meal.

Drugs:

Rosin.
Gentian.
Sulphur, 3.04 per cent.
Epsom salts, 11.14 per cent.
Salt, 6.21 per cent.

International Stock Food Co.,
Minneapolis, Minn.

- 18 A International Stock Food.
Weight of package, 1.8 lbs.; price, 25c.

Base material:

Wheat product.
Screenings.
Gluten feed.

Drugs:

Mustard.
Pepper.
Ginger.
Anise seed.
Licorice.
Cinchona bark.
Gentian.
Columbo.
Elecampane.
Salt, 12.05 per cent.

Prussian Remedy Co.,
St. Paul, Minn.

- 21 A Prussian Stock Tonic.
Weight of package, 1.5 lbs.; price, 25c.

Base material:

Wheat bran.

Drugs:

Mustard hulls.
Pepper.
Charcoal.
Gentian.
Anise.
Fenugreek.
Licorice.
Sassafras.
Ginger.
Sulphur, 3.09 per cent.
Salt, 12.13 per cent.
Glauber's salt, 3.47 per cent.

24 A Prussian Condition Powder.

Weight of package, 0.8 lb.; price, 25c.

Base material:

Wheat bran and middlings.
Linseed meal.

Drugs:

Licorice.
Cinchona bark.
Charcoal.
Salt, 8.51 per cent.
Glauber's salt, 9.88 per cent.
Sulphur, 3.38 per cent.

Pratt Food Co.,
Philadelphia, Pa.

40 A Pratt's Conditioner.

Weight of package, 12.0 lbs.; price, 75c.

Base material:

Wheat product.

Drugs:

Mustard hulls.
Fennel.
Salt, 8.43 per cent.

50 A Pratt's Cow Tonic.

Weight of package, 2.1 lbs.; price, 50c.

Base material:

Corn meal.

Drugs:

Ginger.
Gentian.
Fenugreek.

Iron oxide, 1.13 per cent.

Salt, 9.26 per cent.

28 A Pratt's Animal Regulator.

Weight of package, 1.6 lbs.; price, 25c.

Base material:

Buckwheat hulls.

Corn meal.

Drugs:

Mustard hulls.

Gentian.

Fenugreek.

Ginger.

Charcoal.

Elecampane.

Anise.

Pepper.

Sassafras.

Salt, 15.77 per cent.

The Seneca Chemical and Stock Food Co.,

Tiffin, Ohio.

30 A Seneca Horse Condition Powder.

Weight of package, 1.8 lbs.; price, 25c.

Base material:

Linseed meal.

Drugs:

Fenugreek.

Pepper.

Charcoal.

Sulphur, 2.60 per cent.

Epsom salts, 6.39 per cent.

Salt, 7.95 per cent.

55 A Red Cross Cow Remedy.

Weight of package, 1.4 lbs.; price, 50c.

Base material:

Linseed meal.

Drugs:

Quassia.

Gentian.

Sodium bicarbonate.

Lime.

Nux vomica.

Dr. Joseph Haas Remedy Co.,
Indianapolis, Ind.

32 A Stocktone.

Weight of package, 2.1 lbs.; price, 50c.

Base material:

Linseed meal.

Wheat bran.

Cotton-seed meal.

Corn meal.

Drugs:

Pepper.

Salt, 8.87 per cent.

33 A Dr. Joseph Haas Hog Remedy.

Weight of package, 1.7 lbs.; price, 75c.

Base material:

Linseed meal.

Drugs:

Charcoal.

Gentian.

Calcium carbonate, 47.55 per cent.

Salt, 2.16 per cent.

Iron oxide.

The Capitol Food Co.,
Tiffin, Ohio.

34 A Capitol Animal Regulator.

Weight of package, 6.6 lbs.; price, 50c.

Base material:

Wheat product.

Screenings.

Drugs:

Mustard hulls.

Charcoal.

Anise.

Quassia.

Salt, 25.48 per cent.

Epsom salts, small amount.

Glauber's salt, small amount.

35 A Capitol Stock Remedy.

Weight of package, 1.8 lbs.; price, 25c.

Base material:

Screenings.

Drugs:

Charcoal.

Mustard.

Quassia.

Glauber's salt, 6.62 per cent.

Salt, 32.92 per cent.

Black-Draught Stock Medicine Co.,

Chattanooga, Tenn.

37 A Black Draught Stock Medicine.

Weight of package, 0.4 lb.; price, 25c.

No filler used.

Drugs:

Urya ursi leaves.

Fenugreek.

Cinchona bark.

Senna leaves.

Rosin.

Sulphur, 2.06 per cent.

Salt, 0.71 per cent.

W. H. King Drug Co.,

Raleigh, N. C.

38 A *W. H. King's Celebrated Powders.

Weight of package, 1.1 lbs.; price, 25c.

Base material:

Linseed meal.

Drugs:

Fenugreek.

Ginger.

Charcoal.

Licorice.

Sulphur, 2.69 per cent.

Epsom salts, 5.90 per cent.

Salt, 7.92 per cent.

Barker, Moore & Mein,

Philadelphia, Pa.

39 A *Barker's Vegetable Horse, Cattle and Poultry Powder.

Weight of package, 0.8 lb.; price, 20c.

Base material:

Linseed meal.

Drugs:

Fenugreek.

Ginger.

Charcoal.

Sulphur, 1.62 per cent.

Epsom salts, 1.37 per cent.

Salt, 3.41 per cent.

Dr. C. A. Daniels,
Boston, Mass.

42 A Dr. C. A. Daniels' Cow Invigorator.

Base material:

Wheat bran.

Drugs:

Fenugreek.

Ginger.

Gentian.

Licorice.

Belladonna root.

Elecampane root.

Epsom salts, 8.46 per cent.

Salt, 9.95 per cent.

Sulphur, 3.14 per cent.

Saltpeter (potassium nitrate).

Dr. D. LeGear Co.,
St. Louis, Mo.

62 A Dr. LeGear's Stock Powders.

Weight of package, 1.8 lbs.

Base material:

Wheat bran.

Drugs:

Charcoal.

Ginger.

Ground limestone.

Salt.

Saltpeter (potassium nitrate).

W. H. Justus,
Hendersonville, N. C.

45 A Justus' Horse and Cattle Alterative and Tonic Powders.

Weight of package, 1.3 lbs.

Base material:

Linseed meal.

Drugs:

Fenugreek.

Ginger.

Charcoal.

Salt, 6.22 per cent.

Calcium carbonate, 5.36 per cent.

Sulphur, 17.73 per cent.
Saltpeter (potassium nitrate).

Blackman Stock Remedy Co.,
Chattanooga, Tenn.

- 48 A Blackman's Medicated Salt Brick.
Weight of package, 3.6 lbs.; price, 25c.
No filler used.

Drugs:

Salt, 60.78 per cent.
Nux vomica.
Sulphur, 1.23 per cent.
Copperas (ferrous sulphate).

Burwell and Dunn,
Charlotte, N. C.

- 51 A *Kentucky Condition Powder.
Weight of package, 0.9 lb.; price, 25c.
Base material:

Linseed meal.

Drugs:

Fenugreek.
Nux vomica.
Sulphur, 7.49 per cent.
Copperas (ferrous sulphate).
Calcium carbonate.
Saltpeter (potassium nitrate).

McCormick & Co.,
Baltimore, Md.

- 53 A Jockey Animal Food.
Weight of package, 1.1 lbs.
Base material:

Linseed meal.
Corn meal.

Drugs:

Fenugreek.
Charcoal.
Pepper.
Licorice.
Sulphur, 2.60 per cent.
Salt.
Epsom salts.

Southern Stock Food Co.,
Oxford, N. C.

- 54 A Royster's Stock Food Compound.
Weight of package, 1.5 lbs.; price, 25c.

Base material:

Linseed meal.

Drugs:

Fenugreek.

Gentian.

Sulphur, 6.16 per cent.

Salt.

Epsom salts.

Herb Medicine Co.,
Springfield, Ohio.

- 56 A *Lightning Horse, Cattle and Poultry Powders.
Weight of package, 0.6 lb.; price, 10c.

Base material:

Linseed meal.

Cotton-seed meal.

Drugs:

Rosin.

Fenugreek.

Sulphur, 14.72 per cent.

Salt.

Saltpeter (potassium nitrate).

Calcium carbonate.

Epsom salts.

Grainger Medicine Co.,
Chattanooga, Tenn.

- 57 A Grainger's Tonic Stock Medicine.
Weight of package, 2.2 lbs.; price, 25c.

Base material:

Linseed meal, cotton-seed hulls and small amount meal.

Drugs:

Fenugreek.

Gentian.

Salt.

Iron oxide.

Brown Manufacturing Co.,
Greenville, Tenn.

- 58 A Ramon's American Stock Powders.
Weight of package, 0.8 lb.

Base material:

Wheat bran.

Corn bran.

Drugs:

Charcoal.

Rosin.

Sulphur, 12.24 per cent.

Salt.

Calcium carbonate.

Glauber's salt.

Copperas (ferrous sulphate).

Ashland Stock Food Co.,

Ashland, Ohio.

59 A Ashland Stock Food.

Weight of package, 2.7 lbs.; price, 25c.

Base material:

Wheat bran.

Corn meal.

Drugs:

Charcoal.

Salt.

Epsom salts.

Calcium carbonate.

J. B. Ashcraft's Sons,

Monroe, N. C.

61 A Ashcraft's Cattle Powder.

Weight of package, 0.8 lb.

Base material:

Cotton-seed meal.

Drugs:

Fenugreek.

Ginger.

Stonecypher Horse and Cattle Tonic Co.,

Westminster, S. C.

63 A Stonecypher Horse and Cattle Tonic.

Weight of package, 1.4 lbs.

Base material:

Linseed meal.

Cotton-seed meal.

Wheat middlings.

Drugs:

Ginger.

Sulphur, 14.91 per cent.

Salt.

Epsom salts.

Saltpeter (potassium nitrate).

G. R. Bigler Co.,
Springfield, Ill.

65 A Bigler's Condition Powders.

Weight of package, 1.8 lbs.

Base material:

Linseed meal.

Wheat bran and middlings.

Screenings.

Drugs:

Pepper.

Sulphur, 2.37 per cent.

Epsom salts.

Calcium carbonate.

Lake Shore Seed Co.,
Dunkirk, N. Y.

66 A Wright's Horse and Cattle Powders.

Weight of package, 1.1 lbs.

Base material:

Linseed meal.

Wheat bran.

Drugs:

Charcoal.

Fenugreek.

Sulphur, 10.43 per cent.

Salt.

Calcium carbonate.

Samuel Sutton,
Baltimore, Md.

67 A Great Magic Condition Powders.

No filler used.

Drugs:

Fenugreek.

Rosin.

Gentian.

Ginger.

Cayenne.

Sulphur, 11.82 per cent.

Calcium carbonate.

Saltpeter (potassium nitrate).

Interstate Chemical Co.,
Baltimore, Md.

68 A Speedway Stock Food,
Weight of package, 0.8 lb.

Base material:

Linseed meal.

Wheat bran.

Drugs:

Licorice.

Gentian.

Sulphur, 3.33 per cent.

Salt.

Epsom salts.

Magic Food Co.,

Chattanooga, Tenn.

70 A Magic Stock Tonic.

Weight of package, 2.1 lbs.

Base material:

Cotton-seed hulls, approximately, 73.0 per cent.

Drugs:

Fenugreek.

Gentian.

Ginger, small amount.

Poultry Foods, Tonics and Conditioners.

The Lick Co.,

Winston-Salem, N. C.

1 A Dr. Petty's Premium Poultry Powder.

Weight of package, 1.5 lbs.

Base material:

Wheat middlings.

Bone meal.

Drug:

Fenugreek.

American Stock Food Co.,

Fremont, Ohio.

11 A American Poultry Food.

Weight of package, 1.6 lbs.; price, 25c.

Base material:

Ground bone.

Corn meal.

Oyster shells.

Linseed meal.

Drugs:

Pepper.

Epsom salts, 0.78 per cent.

Calcium carbonate, 29.20 per cent.

Iron oxide, small amount.

Fairfield Manufacturing Co.,
Philadelphia, Pa.

13 A Fairfield's Blood Tonic and Egg Producer.

Weight of package, 3.8 lbs.; price, 50c.

Base material:

Dried blood.

Ground bone.

Wheat bran.

Drugs:

Rosin.

Limestone (calcium carbonate), 17.51 per cent.

Epsom salts, 1.88 per cent.

The G. E. Conkey Co.,
Cleveland, Ohio.

15 A Conkey's Laying Tonic.

Weight of package, 3.6 lbs.; price, 50c.

Base material:

Dried blood.

Linseed meal.

Drugs:

Fenugreek.

Charcoal.

Salt, 3.59 per cent.

Glauber's salt, 2.60 per cent.

Sulphur, 3.82 per cent.

16 A Conkey's Poultry Tonic.

Weight of package, 0.5 lb.; price, 25c.

Base material:

Linseed meal.

Drugs:

Ginger.

Cinchona bark.

Licorice.

Gentian.

Epsom salts, 3.43 per cent.

Sulphur, 10.15 per cent.

International Stock Food Co.,
Minneapolis, Minn.

17 A International Poultry Food.

Weight of package, 1.6 lbs.; price, 25c.

Base material:

Wheat middlings.

Gluten feed.

Dried blood.

Screenings.

Drugs:

Charcoal.

Mustard.

Pepper.

Elecampane.

Licorice.

Gentian.

Limestone (calcium carbonate), 8.26 per cent.

Epsom salts, small amount.

Prussian Remedy Co.,

St. Paul, Minn.

22 A Prussian Poultry Tonic.

Weight of package, 1.5 lbs.; price, 25c.

Base material:

Wheat product.

Ground bone.

Linseed meal.

Drugs:

Charcoal.

Sassafras.

Ginger.

Cayenne.

Sulphur, 2.61 per cent.

Salt, 5.60 per cent.

Calcium carbonate, 17.71 per cent.

Pratt Food Co.,

Philadelphia, Pa.

27 A Pratt's Poultry Regulator.

Weight of package, 1.8 lbs.; price, 25c.

Base material:

Buckwheat hulls.

Corn meal.

Drugs:

Fenugreek.

Ginger.

Mustard hulls.

Calcium carbonate, 2.82 per cent.

Sulphur, 1.28 per cent.

Iron oxide, 0.92 per cent.

The Seneca Chemical and Stock Food Co.,
Tiffin, Ohio.

31 A Seneca Poultry Powder.

Weight of package, 1.8 lbs.; price, 25c.

Base material:

Linseed meal.

Drugs:

Fenugreek.

Charcoal.

Sulphur, 3.58 per cent.

Iron oxide, 2.41 per cent.

Epsom salts, 2.45 per cent.

Calcium carbonate, 26.95 per cent.

The Capitol Food Co.,
Tiffin, Ohio.

36 A Capitol Poultry Remedy.

Weight of package, 2.1 lbs.; price, 25c.

Base material:

Consists largely of ground screenings.

Drugs:

Quassia.

Cayenne.

Sulphur, 5.62 per cent.

Iron oxide, 4.18 per cent.

Epsom salts, 5.75 per cent.

Dr. D. LeGear Co.,
St. Louis, Mo.

44 A Dr. LeGear's Poultry Powder.

Weight of package, 1.6 lbs.; price, 25c.

Base material:

Wheat bran.

Drugs:

Ginger.

Charcoal.

Sulphur, 1.15 per cent.

Calcium carbonate, 12.64 per cent.

Salt, 6.30 per cent.

Drs. Hess & Clark,
Ashland, Ohio.

49 A Dr. Hess Poultry Panacea.

Weight of package, 1.4 lbs.; price, 25c.

Base material:

Wheat bran.

Drugs:

Nux vomica.
Saltpeter (potassium nitrate).
Iron oxide, 3.57 per cent.
Copperas (ferrous sulphate).
Calcium carbonate, 26.33 per cent.
Salt.
Sodium hyposulphite.

McCormick & Co.,
Baltimore, Md.

52 A Uncle Sam's Chicken Powder.

Weight of package, 0.5 lb.

Base material:

Linseed meal.
Wheat bran.

Drugs:

Fenugreek.
Charcoal.
Mustard hulls.
Nux vomica.
Anise.
Rosin.
Salt.
Epsom salts.

Southern Stock Food Co.,
Oxford, N. C.

74 A Royster's Poultry Food.

Price, 25c.

Base material:

Linseed meal.

Drugs:

Fenugreek.
Mustard hulls.
Sulphur, 4.96 per cent.
Epsom salts.

Tennessee Medicine Co.,
Knoxville, Tenn.

60 A Knaffl's Royal Poultry Food.

Weight of package, 1.6 lbs.

Base material:

Wheat bran and middlings.
Corn meal.

Drugs:

Ground limestone.

Iron oxide, small amount.

G. R. Bigler Co.,
Springfield, Ill.

64 A Bigler's Poultry Compound.

Weight of package, 2.2 lbs.

No vegetable ingredients.

Drugs:

Sulphur, 2.24 per cent.

Calcium carbonate, 23.92 per cent.

Iron oxide.

W. H. McNair,
Tarboro, N. C.

69 A McNair's Chicken Powder.

Weight of package, 0.5 lb.

No filler used.

Drugs:

Nux vomica.

Capsicum, cayenne peper.

Gentian.

Camphor.

Epsom salts, 34.80 per cent.

Sulphur, 9.90 per cent.

Magic Food Co.,
Chattanooga, Tenn.

71 A Magic Poultry Tonic.

Weight of package, 2.1 lbs.

Base material:

Cotton-seed hulls, large amount.

Drugs:

Charcoal.

Fenugreek.

Ginger, small amount.

Copperas (ferrous sulphate), small amount.

Ground oyster shells.

Sulphur, small amount.

Cypher's Incubator Co.,
Buffalo, N. Y.

73 A Full-Nest Egg Food.

Base material:

Linseed meal.

Dried blood.
Ground bone.

Drugs:

Sulphur, 12.48 per cent.
Salt.
Copperas (ferrous sulphate).
Saltpeter (potassium nitrate).

Sixty-four (64) samples of stock and poultry remedies were examined.

The following table shows the number of times that the different base materials were used either alone or in combination:

Wheat bran	21	Corn meal	9
Wheat middlings	15	Gluten feed	2
Linseed meal	28	Buckwheat hulls	2
Cotton-seed meal	5	Cotton-seed hulls	3
Dried blood	5	Corn bran	1
Ground bone	6		

The following table shows the number of times that the different drugs were used:

Fenugreek	32	Mustard	10
Charcoal	27	Anise	5
Salt	42	Columbo	1
Pepper	12	Elecampane	4
Copperas	9	Sa-safras	3
Sulphur	36	Fennel	1
Glauber's salt	9	Iron oxide	10
Sodium bicarbonate	4	Camphor	1
Ginger	21	Sodium hyposulphite	1
Licorice	12	Oyster shells	2
Saltpeter	11	Cayenne	4
Nux vomica	7	Limestone	4
Calcium carbonate	19	Belladonna root	1
Cinchona bark	5	Urva ursi leaves	1
Gentian	19	Senna leaves	1
Epsom salts	23	Lime	1
Rosin	7	Quassia	4

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
AGRONOMY DIVISION

RALEIGH

Volume ²~~31~~

FEBRUARY, 1911.

Number 2.

- I. VARIETY TESTS OF CORN.**
- II. VARIETY TESTS OF COTTON.**

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‡ Assigned by Bureau of Animal Industry, U. S. Department of Agriculture.

RALEIGH, February 3, 1911.

TO HON. W. A. GRAHAM,

Commissioner of Agriculture.

SIR:—I have the honor to transmit herewith a manuscript discussing the results of the variety tests of corn and cotton made by the Agronomy Division in different parts of the State during the past season.

It has seemed better, in this manuscript, to omit the discussions of minor and relatively unimportant details and call attention more particularly to the facts that are of most interest to the general farmers.

Respectfully submitted,

J. L. BURGESS,
Agronomist.

INTRODUCTION.

We can not lay too much stress on the importance of the farmer's selecting his own seed wherever it is practicable for him to do so. It not only saves him money in the purchase of the so-called improved seeds, but it guards him against great loss in yield from using varieties which, though good in their own localities, are worthless when grown under new conditions of soil and climate.

There are cases, however, where it may pay the farmer to let some good, honest seed breeder improve his seed for him while he occupies his time with other lines of his business. But whenever the farmer purchases seed corn and cotton seed, and seed wheat and seed oats, he should not fail to have his breeder answer in detail the following questions, namely: How long have you been improving this variety? What kind of soil do you grow your crop on—sandy soil, clay soil, upland soil, or bottomland soil? Is the soil red, gray, or black. Having received a faithful answer to these questions, the farm should then know the exact cultural methods used by his breeder. He should know first how deep the land was plowed and when the plowing was done; how much and what kind of manure and fertilizers were used; how often and how late cultivation was practiced as well as what tools were used in the cultivation; then, finally, what yield per acre was obtained under his conditions. Less information than this is insufficient for the farmer who is going to risk his profits for the coming year on the possible performance or nonperformance of the variety in question. No farmer would buy a horse without some knowledge of his performance record, and why should he know less about a new variety of corn, cotton, or wheat than he would insist on knowing about the horse?

We have interviewed a large number of commercial plant breeders in various parts of the United States, and all of them say that they would have been handsomely paid for their work from the increased yields on their own farms had they not sold a pound of seed to the public. It should be significant to the farmers of our State that these commercial breeders are not in the market for new varieties. They are confident that they have the best varieties they can get. Where did they get them? They made them.

Last year we got together a large number of varieties of corn and cotton and grew them in competition with each other in different parts of the State on as many different types of soil. The results of these tests will be seen in the following tables.

In addition to the work done on the Test Farms, variety tests of corn and cotton were conducted on the farm of S. W. Wilkinson, near Belhaven, and on the Caledonia farm, near Tillery, in Halifax County. The work on the Caledonia farm was done at the request of Captain Laughinghouse, Superintendent of the State's Prison.

VARIETY TESTS OF CORN AND COTTON IN VARIOUS PARTS OF THE STATE ON DIFFERENT TYPES OF SOIL DURING 1910.

VARIETY TESTS AT BELHAVEN.

The work on the Wilkinson farm met with a serious accident toward the end of the season, which rendered the results unpublishable in tabular form. The records of the variety tests of corn were not available and those from the variety tests of cotton could be used but in a very general sense.

The indications from our work here, however, are that some strains of the King type of cotton is best suited to these black soils in the eastern part of the State. The varieties yielding the highest were King's Improved, King's Re-Improved, Williams, Brown No. 1, and Ninety Day, in the order named. These, it will be noted, are all of the King type.

Next year we hope to put on a more extensive test on these black loam and peaty soils with a view to ascertaining the best varieties of both cotton and corn for use in this part of the State.

VARIETY TESTS OF COTTON AND CORN ON THE CALEDONIA FARM.

The soil on which these tests were placed is very unlike most of the soils in the coastal plain: They represent the second bottomlands along the Roanoke and other of the principal rivers in the eastern part of the State. The soil is a yellow loam to silt loam in texture, has a gently rolling surface and needs but good tillage and a good supply of organic matter to make it quite fertile.

The test of the varieties of cotton was made at the lower camp, under Captain Christian, while the test of the varieties of corn were conducted at the upper camp, under Captain Rheim.

VARIETY TESTS OF COTTON.

Twenty-one different varieties of cotton were tested on the leading soil type of this farm during the past season. The results obtained must be taken as indications only since a number of similar tests will be necessary to show us the highest average yielding varieties throughout a period of years; and this is what the farmer is really interested in more than to know what varieties out-yielded during any single season.

The following table shows the yield of seed cotton and lint per acre, the per cent of lint to seed, and value of same at current prices, as well as other facts of minor importance.

It will be seen from the table that the highest yielding varieties on this type of soil were the Climax, King's Re-Improved, Edgemont, Morgan's Climax, and Williams, in the order named. It will be noted, however, that King's Re-Improved had but a fraction over 70 per cent of a stand, while the Climax had something over 80 per cent of a stand, and this must be taken into consideration when comparing the yields of any of the different varieties. (Table I.)

TABLE No. 1.—VARIETY TESTS OF COTTON ON THE CALEDONIA FARM IN 1910.

VARIETY	NUMBER OF STALKS PER PLAT.		YIELD OF SEED COTTON PER PLAT.			YIELD PER ACRE.							Rank according to Yield of Seed Cotton Per Acre.		
	For perfect Stand.	By Actual Count.	Average Height of Stalks at Maturity—Inches.	First Picking, Oct. 31.	Second Picking, Dec. 15.	Total Pickings.	Total Pounds Seed Cotton Per Acre.	Pounds of Lint in 100 Pounds Seed Cotton.	Pounds of Seed in 100 Pounds Seed Cotton.	Pounds of Lint.	Pounds of Seed.	Value of Lint at 15c. a pound.		Value of Seed at 50c. a Bushel.	Total Value of Lint and Seed per Acre.
Climax.....	263	300	40	14	26	40	800	33.5	66.5	268.00	532.00	\$ 40.20	\$ 8.96	\$ 49.06	1
King's Re-Improved	263	258	32	22	12.5	34.5	690	34.7	65.3	239.43	450.57	35.91	7.50	43.41	2
Edgemont.....	263	321	34	11	23	34	680	33.7	66.3	229.16	450.84	34.37	7.51	41.88	3
Morgan's Climax.....	263	315	40	11	21	32	640	34.4	65.6	220.16	419.84	33.02	6.99	40.01	4
Williams.....	263	325	30	18	13	31	620	35.3	64.7	218.86	401.14	32.82	6.68	39.50	5
Brown's No. 1.....	263	299	44	13	16.5	29.5	590	36.0	64.0	212.40	377.60	31.86	6.29	38.15	6
Sugar Loaf.....	263	318	40	18	13	31	620	33.4	66.6	207.08	412.92	31.06	6.88	37.94	7
Lewis Long Staple	263	265	45	19	10	29	580	35.4	64.6	205.32	374.68	30.79	6.24	37.03	8
Rosser No. 1.....	263	258	44	9	20.5	29.5	590	34.4	65.6	202.96	337.04	30.44	6.45	36.89	9
Thigpen's Prolific.....	263	251	39	7	20	27	540	38.5	61.5	207.90	332.10	31.18	5.53	36.71	10
King's Improved.....	263	312	36	14	11	25	500	35.6	64.4	178.00	322.00	26.70	5.36	32.06	11
Russell Big Boll.....	263	356	44	7	18.5	25.5	510	33.3	66.7	169.83	340.17	25.47	5.66	31.13	12
Shine's Early.....	263	304	42	10.5	16	26.5	530	30.2	69.7	160.06	369.40	24.00	6.15	30.15	13
Bradbury's Improved.....	263	316	32	7	16	23	460	34.9	65.1	160.54	299.46	24.08	4.99	29.07	14
Cook's Improved.....	263	255	42	8	14	22	440	35.5	64.5	156.20	283.80	23.43	4.73	28.16	15
Ninety Day.....	263	271	39	8	13.5	21.5	30	32.8	67.2	141.04	288.96	21.15	4.81	25.96	16
Excelclor Prolific.....	263	290	39	6	11	17	340	36.7	63.3	124.78	215.22	18.71	3.58	22.29	17
Hawkins' Prolific.....	263	213	42	8	8.5	17	340	34.7	65.3	117.98	222.02	17.69	3.70	21.39	18
Bank Account.....	263	190	40	5	6.5	11.5	230	34.7	65.3	89.81	140.19	13.47	2.33	16.80	19
Toole.....	263	217	36	4	6.5	10.5	210	41.8	58.2	87.78	122.22	13.16	2.03	15.19	20
Moss Improved.....	263	189	42	1.5	7.5	9	180	38.9	61.1	70.02	109.98	10.50	1.83	12.33	21

TABLE No. II—VARIETY TESTS OF CORN AT THE CALEDONIA FARM IN 1910.

VARIETY.	NUMBER OF STALKS PER PLAT.		YIELD PER PLAT.		YIELD PER ACRE.		SHELLING CAPACITY.		TOTAL WEIGHTS.		Rank according to Bushel of Shelled Corn. Yield per Acre.				
	For Perfect Stand.	By Actual Count.	Per Cent of Stand.		Pounds Corn.	Pounds Stover.	Pounds Ears.	Bushels Shelled Corn	Pounds of Ears to Shell One Bushel.	Per Cent. Grain.		Per Cent. Cob.	Per Cent Hairs.	Per Cent. Stover.	Pounds of Stover Per Acre.
Southern Beauty.....	181	170	93	127	119.5	2540	41.9	60.5	85.2	14.8	51.5	48.5	2390	51.5	1
Biggs' Seven Ear.....	181	178	98	131	110.5	2620	37.4	70	84.3	15.7	54.2	45.8	2210	59	2
Henry Grady.....	181	173	95	119.5	138.5	2390	34.8	68.5	75.9	24.1	37.5	62.5	2670	52	3
Boone County.....	181	163	90	110	99	2200	34.6	63.5	83.4	16.6	52.6	47.4	1980	53	4
Goodman's Prolific.....	181	163	90	110.5	134.5	2210	34	65	88.5	11.5	45.1	54.9	2690	57.5	5
Batts' Four Ear.....	181	167	92	118	121.5	2360	33.4	70.5	81.6	18.4	49.2	50.8	2430	57.5	6
Williams.....	181	176	97	122.5	142.5	2450	33	74	77.7	22.3	42.2	57.8	2850	57.5	7
Columbia Beauty.....	181	176	97	102.5	103.5	2050	31.5	65	83.4	16.2	49.7	50.3	2070	54.5	8
Southern Snow Flake.....	181	163	90	100	97	2000	30.5	65.5	83.9	16.1	50.7	49.3	1940	55	9
Hickory King.....	181	168	92	97	111.5	1940	30.3	64	86.8	13.2	46.5	53.5	2230	55.5	10
Indian Twin.....	181	188	100	109	113	2180	30.2	72	81.5	18.8	49.0	51.0	2200	58.5	11
Tillery.....	181	186	100	103	89.5	2060	30	68.5	83.9	16.1	53.5	46.5	1790	57.5	12
Shenandoah White Dent.....	181	179	98	100	79.5	2000	29.4	68	84.5	15.5	55.6	44.4	1590	57.5	13
Weekley's Improved.....	181	166	91	102.5	122.5	2050	29	70.5	81.5	18.5	45.5	54.5	2450	57.5	14
White Majestic.....	181	183	100	96	105.5	1920	29	66	85.6	14.4	47.3	52.4	3110	56.5	14
Parkinson's Silver Corn.....	181	180	99	100	130	2000	28.7	69.5	80.6	19.4	43.4	56.6	2600	55	15
Eureka.....	181	160	88	100	139	2000	28.5	70	82.5	17.8	41.8	58.2	2780	57.5	16
Parker's Prolific.....	181	180	99	104	108	2080	28.4	73	78.8	21.2	48.9	51.1	2160	57.5	17
Farmer's Favorite.....	181	178	98	98.5	102	1970	27.3	72	80.6	19.4	49.1	50.9	2040	58	18
Marlboro Prolific.....	181	175	96	93	124	1860	25.4	73	81.5	18.5	42.8	57.2	2480	59.5	19
Blount's Prolific.....	181	191	100	75	97	1500	20.8	72	86.6	17.4	43.6	56.4	1940	59.5	20

TABLE No. III—VARIETY TESTS OF CORN AT THE EDGECOMBE TEST FARM IN 1910.

VARIETY.	NUMBER OF STALKS PER PLAT.		YIELD PER PLAT.		YIELD PER ACRE.		SHELLING CAPACITY.		PER CENT TOTAL WEIGHTS.		Pounds of Shovel Per Acre.	Weight of Measured Bushel of Shelled Corn.	Rank according to Yield per Acre.
	For Perfect	By Actual	Corn—pounds.	Shovel— Pounds.	Pounds Ears.	Shelled Corn— Bushels.	Pounds Ears to Shell One Bushel.	Per Cent. Grain.	Per Cent. Cob.	Per Cent. Ears.			
Hickory King.....	272	282	122	183	2440	35.5	69	81.1	18.9	40	3660	56	1
Biggs' Seven Ear	272	257	123	102	2460	31.9	77	77.9	22.1	54.6	2040	60	2
Southern Beauty.....	272	255	113	127	2260	31.3	72	81.9	18.1	47.0	2540	59	3
Williams.....	272	259	120	160	2400	28.9	83	68.6	31.4	42.8	3200	57	4
Eureka.....	272	266	115	160	2300	27.7	83	72.2	27.8	41.8	3200	60	5
Batts' Four Ear.....	272	257	107	123	2140	27.4	78	75.6	24.4	45.5	2560	59	6
Columbia Beauty.....	272	254	91	139	1820	26.3	69	79.7	20.3	39.5	2780	55	7
Parker's Prolific	272	259	96	124	1960	26	75	77.3	22.7	43.6	2480	58	8
Parkinson's Silver Corn.....	272	285	83	127	1760	25.5	69	81.1	18.9	40.9	2540	56	9
Boone County.....	272	250	88	112	1773	25.1	70	77.1	22.9	44	2240	54	10
Henry Grady.....	272	240	97	223	1940	24.8	78	66.6	33.4	30.3	4460	52	11
Indian Twin.....	272	272	95	95	1900	23.7	80	75	25	50	1900	60	12
Goodman's Prolific.....	272	277	85	140	1700	23.6	72	83.3	16.7	37.7	2800	60	13
Southern Snow Flake.....	272	243	88	102	1760	23.4	75	76	24	46.3	2040	57	14
Weckley's Improved.....	272	247	90	115	1800	23.3	77	74	26	43.9	2300	57	15
White Majestic.....	272	261	88	82	1760	22.8	77	79.2	20.8	51.7	1640	61	16
Shenandoah White Dent.....	272	243	80	125	1600	21.6	74	75.6	24.4	39	2500	56	17
Blount's Prolific.....	272	249	83	92	1660	21	79	78.4	21.6	47.4	1940	62	18

TABLE No. IV.—VARIETY TESTS OF COTTON ON THE REDELL TEST FARM IN 1910.

VARIETY.	NUMBER OF STALKS PER PLAT.		Average Height of Stalks at Maturity.	YIELD OF SEED COTTON PER PLAT.						Total Pounds Seed Cotton per Acre.	No. of Bolls to make One Pound of Seed Cotton.	Pounds of Lint in One Hundred Pounds of Seed Cotton.	Pounds of Seed in One Hundred Pounds of Seed Cotton.	Pounds of Lint per Acre.	Pounds of Seed per Acre.	Value of Lint per Acre at 15c. a Pound.	Value of Seed per Acre at 50c. a Bushel.	Total Value of Lint and Seed per Acre.	Rank According to Yield per Acre.
	For Perfect Stand.	By Actual Count.		First Pick- ing, Oct. 5.	Second Pick- ing, Nov. 7.	Third Pick- ing, Dec. 8.	Total Pickings.												
Edgemont.....	488	438	32	13	53	13.5	79.5	1590	66	32.2	67.8	612	978	\$ 91.80	\$ 16.30	\$108.10	1		
Russell Big Boll.....	488	431	36	17	50.25	19	86.25	1725	67	34	66	585	1140	87.75	19.06	106.75	2		
King's Improved.....	488	455	36	30	41.5	6.5	78	1560	71	35.5	64.5	554	1006	83.10	16.77	99.87	3		
Climax.....	488	397	40	15	53.5	12	80.5	1610	76	33	67	831	1079	79.65	17.98	97.63	4		
Brown's No. 1.....	488	403	36	11	52.5	8.25	71.75	1435	63	38.5	61.5	552	883	82.80	14.71	97.51	5		
Cook's Improved.....	488	408	37	9	47.5	13	69.5	1390	66	39.2	60.8	547	843	82.05	14.05	96.10	6		
Rosser No. 1.....	488	442	42	22.5	47	8	77.5	1550	90	33.7	66.3	522	1028	78.30	17.13	95.43	7		
Excelstor Prolific.....	488	477	36	8	48	10	66	1320	85	37.1	62.9	550	770	82.50	12.83	95.33	8		
Bank Account.....	488	486	36	27	42.5	6.5	76	1520	97	34.4	65.6	523	997	78.45	16.62	95.07	9		
Moss Improved.....	488	444	38	11.5	47.5	7.5	66.5	1330	82	40.6	59.4	540	790	81.00	13.17	94.17	10		
Williams.....	488	438	30	28.75	40	5	73.75	1475	101	34.9	65.1	515	960	77.25	16.00	93.25	11		
Ninety Day.....	488	417	36	27	44	3	74	1480	87	34	66	503	977	75.45	16.28	91.73	12		
Toole.....	488	466	31	7	49	7.25	63.25	1265	93	40.4	59.6	511	754	76.65	12.57	89.22	13		
Thigpen Prolific.....	488	445	32	8	53.5	8	69.5	1390	65	34.2	65.8	476	914	71.40	15.23	86.63	14		
Silene's Early.....	488	453	33	20	43	6	69	1380	90	34.1	35.9	470	910	70.75	15.17	85.67	15		
Bradbury Improved.....	488	450	30	8	39	12.5	59.5	1190	66	37.7	62.3	448	742	67.20	11.37	78.57	16		
Morgan's Climax.....	488	379	36	10	43.25	8	61.25	1225	69	34.1	65.9	418	807	62.70	13.45	76.15	17		
Hawkins.....	488	447	40	7	41.25	8	56.25	1125	92	34.6	65.4	389	736	58.35	12.37	70.60	18		
Sugar Loaf.....	488	447	34	20	38.5	3.5	62	1240	96	35.2	64.8	436	804	55.40	13.40	68.80	19		
Lewis Long Staple.....	488	420	46	10	40	5	55	1100	73	29.1	70.9	320	780	48.00	13.00	61.00	20		

TABLE No. V—VARIETY TESTS OF CORN AT THE IREDELL TEST FARM IN 1910.

VARIETY.	YIELD PER PLAT.			YIELD PER ACRE.		SHELLING CAPACITY.		TOTAL WEIGHTS.		Pounds of Stover per Acre.	Weight of Shelled Corn.	Rank According to Yield per Acre.
	Number of Stalks per Plat.	Pounds of Ears.	Pounds of Stover.	Pounds of Ears.	Shelled Corn.	Pounds of Ears to Shell One Bushel.	Per Cent. Grain.	Per Cent. Cob.	Per Cent. Ears.			
Southern Beauty.....	220	134	146.0	2680	39.4	68	85.2	14.8	47.8	52.2	2920	58
Weekley's Improved.....	220	138.25	196.05	2770	38.4	72	83.3	16.7	41.3	58.7	3930	60
Blount's Prolific.....	220	135	15.0	2700	36.9	73	83.5	16.5	47.3	52.7	3000	61
Batts' Four Ear.....	220	134.5	120.5	2690	36.2	74.25	82.1	17.9	52.7	47.3	2410	61
White Majestic.....	220	123.5	146.5	2470	35.7	69	86.9	13.1	45.7	54.3	2930	60
Parker's Prolific.....	220	129	126	2580	35.2	73	82.1	17.9	50.5	49.5	2520	60
Indian Twin.....	220	130.5	124.5	2610	34.8	75	81.3	18.7	51.1	48.9	2490	61
Boone County.....	220	116.5	113.5	2330	32.8	71	83	17	50.6	49.4	2270	59
Hickory King.....	220	106	94	2120	32.1	66	87.8	12.2	53	47	1880	58
Southern Snow Flake.....	220	112	153	2240	32	70	84.2	15.8	42.2	47.8	3060	59
Goodman's Prolific.....	220	108	147	2160	31.7	68	88.2	11.8	42.3	57.7	2940	60
Parkinson Silver Corn.....	220	100.25	165.75	2185	31.6	69	85.1	14.9	39.7	60.3	3315	58.75
Williams.....	220	199	296	2380	31.5	75.5	79.8	20.2	28.6	71.4	5920	60.25
Shenandoah White Dent.....	220	110	95	2200	31.4	70	82.8	17.2	53.6	46.4	1900	58
Columbia Beauty.....	220	102	143	2040	30	68	85.2	14.8	44.8	55.2	2860	58
Biggs' Seven Ear.....	220	108	137	2160	29.5	73	83.5	16.5	44	56	2740	61
Henry Grady.....	220	99	281	1980	29.3	67.5	80	20	26	74	5620	54
Eureka.....	220	108.5	196.5	2170	29.1	74.5	81.2	18.8	35.5	64.5	3930	60.5

TABLE No. VI—VARIETY TESTS OF CORN ON THE BUNCOMBE TEST FARM IN 1910—BOTTOMLAND SOIL.

VARIETY.	Number of Stalks per Plat.	Per Cent. Germination.	Date of Maturity.	Number of Ears to Shell One Bushel.	Weight of Measured Bushel of Shelled Corn.	Weight of Cobs from Measured Bushel of Shelled Corn.	Per Cent. Shrinkage from October 17th to January 15th.	YIELD PER PLAT.		YIELD PER ACRE.	SHELLING CAPACITY.		RELATIVE SIZE OF EARS.	Rank According to Number of Bushels of Shelled Corn per Acre.
								Weight of Ears.	Weight of Shovel.		Per Cent. Grain.	Per Cent. Cobs.		
Southern Beauty.....	200	98	10-10	93	51	10	.16	129	79	42.3	83.6	16.4	M. E.	1
Wilson's Success.....	200	---	10-5	106	52	13	.04	131.5	88.5	40.4	80	20	M. E.	2
Eureka.....	200	94	10-10	120	52	16	.08	132	101	38.8	76.4	23.6	M. E.	3
Hickory King.....	200	93	10-5	118	53	7	.6	115	72.5	38.3	88.3	11.7	M. E.	4
Biggs' Seven Ear.....	200	99	10-5	164	55.5	13.5	.09	129.5	81.5	37.5	80	20	S. E.	5
Shenandoah White Dent.....	200	---	10-1	90	51	10	.05	114	69	37.3	83.6	16.4	M. E.	6
Boone County.....	200	97	10-1	86	51	14	.05	121	72.5	37.2	78.4	21.6	M. E.	7
Williams.....	200	---	10-10	103	54	18	.075	129	104.5	36.8	77.1	22.9	L. E.	8
Weekley's Improved.....	200	91	10-5	144	54	12	.10	121	86	36.6	81.8	18.2	M. E.	9
Cocke's Prolific.....	200	---	10-1	120	52.5	12	.055	115.5	71.5	35.8	81.4	18.6	S. E.	10
Batts' Four Ear.....	200	91	10-5	152	54.5	15	.13	122.5	84	35.2	78.4	21.6	S. E.	11
Parker's Prolific.....	200	91	10-10	114	52	14	.11	115	73	34.8	78.7	21.3	M. E.	12
Columbia Beauty.....	200	89	10-5	100	53	10	.06	109	66.5	34.6	84.1	15.9	L. E.	13
Southern Snow Flake.....	200	87	10-5	74	50	12.5	.06	106	87	33.9	79.9	20.1	L. E.	14
White Majestic.....	200	77	10-10	106	53	9	.065	100	86.5	32.2	85	15	M. E.	15
Parkinson's Silver Corn.....	200	86	10-10	114	54	14.5	.10	107	85.5	31.2	81.1	18.9	L. E.	16
Blount's Prolific.....	200	---	10-5	140	56.5	12.5	.17	100.5	73.5	29.1	81.8	18.2	M. E.	17
Goodman's Prolific.....	200	67	10-5	118	59	10	.09	119.5	86	34.6	85.5	14.5	M. E.	18

TABLE No. VII—VARIETY TESTS OF CORN ON THE BUNCOMBE TEST FARM IN 1910—UPLAND SOIL.

VARIETY.

VARIETY.	Number of Stalks per Plat.	Date of Maturity.	Number of Ears per Plat.		Weight of Ears.	Weight of Stover.	Bushels of Shelled Corn.	Pounds of Stover.	RELATIVE SIZE OF EARS.		Rank According to Number of Bushels of Shelled Corn per Acre.
			L. E.	S. E.					Large Ears. M. E.	Small Ears. S. E.	
Henry Grady.....	160	10-10	146	125	127	70	3810	L. E.	1		
Hickory King.....	160	10-3	240	128.7	87	64.3	2610	M. E.	2		
Southern Beauty.....	160	10-10	204	125	86	61.5	2680	L. E.	3		
Williams.....	160	10-5	179	126.5	111	54.2	3330	L. E.	4		
Wilson's Success.....	160	10-10	210	116.5	87	53.7	2610	M. E.	5		
Eureka.....	160	10-10	210	113	107	49.8	3210	M. E.	6		
Southern Snow Flake.....	160	10-5	145	101	73	43.4	2190	M. E.	7		
Biggs' Seven Ear.....	160	10-3	309	111	72.5	48.1	2175	S. E.	8		
Columbia Beauty.....	160	10-3	149	100	73	47.6	2190	L. E.	9		
Boone County.....	160	9-25	151	103	63.5	47.5	1905	L. E.	10		
Goodman's Prolific.....	160	10-3	213	108	85	47	2550	ME-L.E.	11		
Batts' Four Ear.....	160	10-5	230	109	88	47	2640	M. E.	11		
Cocke's Prolific.....	160	10-1	230	104.5	79	46.8	2370	M. E.	12		
Parker's Prolific.....	160	10-8	198	102	76.5	46.3	2295	M. E.	13		
Weekley's Improved.....	160	10-5	223	97	85	44	2550	S. E.	14		
White Majestic.....	160	10-10	173	89	76	43	2280	M. E.	15		
Shenandoah White Dent.....	160	10-1	145	86.5	54	42.5	1620	M. E.	16		
Parkinson's Silver Corn.....	160	10-10	151	87.5	99	38.3	2970	M. E.	17		
Blount's Prolific.....	160	10-3	191	86	73	37.3	2190	S. E.	18		

SOURCES OF SEED TESTED IN 1910—CORN.

VARIETIES.	SOURCE OF SEED.
Hickory King.....	A. O. Lee, Bartee, Va.
Biggs' Seven Ear.....	Noah Biggs, Scotland Neck, N. C.
Batts' Four Ear.....	J. F. Batts, Garner, N. C.
Southern Beauty.....	L. A. Stroupe, Tobaccoville, N. C.
Goodman's Prolific.....	J. K. Goodman, Mt. Ulla, N. C.
Farmers' Favorite.....	A. Cannon, Horse Shoe, N. C.
Henry Grady.....	W. G. Headen, Austill, Ga.
Williams.....	S. C. Williams, Franklinton, N. C.
Boone County.....	T. W. Wood & Son, Richmond, Va.
Eureka.....	T. W. Wood & Son, Richmond, Va.
Southern Snow Flake.....	T. W. Wood & Son, Richmond, Va.
Columbia Beauty.....	T. W. Wood & Son, Richmond, Va.
Shenandoah White Dent.....	T. W. Wood & Son, Richmond, Va.
Parkinson's Silver Corn.....	T. W. Wood & Son, Richmond, Va.
White Majestic.....	T. W. Wood & Son, Richmond, Va.
Blount's Prolific.....	T. W. Wood & Son, Richmond, Va.
Weekley's Improved.....	Iredell Test Farm, Statesville, N. C.
Marlboro Prolific.....	Excelsior Seed Farm, Cheraw, S. C.
Parker's Prolific.....	T. B. Parker, Raleigh, N. C.
American Queen.....	T. W. Dalton, Critz, Va.
Pool's.....	J. C. Pool, Marion, N. C.
Indian Twin.....	H. T. Macon, Warrenton, N. C.

SOURCES OF SEED TESTED IN 1910—COTTON.

VARIETIES.	SOURCE OF SEED.
Rosser No. 1.....	Hastings Seed Co., Atlanta, Ga.
Bank Account.....	Hastings Seed Co., Atlanta, Ga.
Climax.....	W. H. Killebrew, Rocky Mount, N. C.
Ninety Day.....	J. G. Truitt, La Grange, Ga.
Moss Improved.....	A. B. Moss, Norway, S. C.
Bradbury's Improved.....	J. E. Bradbury, Athens, Ga.
Edgemont.....	J. C. Little, Louisville, Ga.
Sugar Loaf.....	I. W. Mitchell, Youngsville, S. C.
Cook's Improved.....	J. R. Cook, Schley, Ga.
Brown No. 1.....	M. L. Brown, Decatur, Ga.
Shine's Early Prolific.....	J. A. Shine, Faison, N. C.
Thigpen Prolific.....	R. L. Thigpen, Milfred, N. C.
Williams.....	S. C. Williams, Franklinton, N. C.
Morgan's Climax.....	T. W. Wood & Son, Richmond, Va.
Toole.....	T. W. Wood & Son, Richmond, Va.
Russell Big Boll.....	T. W. Wood & Son, Richmond, Va.
Hawkins' Prolific.....	T. W. Wood & Son, Richmond, Va.
King's Improved.....	Iredell Test Farm, Statesville, N. C.
Excelsior Prolific.....	Excelsior Seed Farm, Cheraw, S. C.
Lewis Long Staple.....	E. P. Lewis, Gastonia, N. C.
King's Re-Improved.....	Sugar Loaf Cotton Farm, Youngsville, N. C.

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DEPARTMENT OF AGRICULTURE
RALEIGH

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SUPPLEMENT, FEBRUARY, 1911.

Whole No. 147.

REPORT OF GENERAL WORK ON THE BUNCOMBE AND TRAN-
SYLVANIA TEST FARMS.



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R. W. COLLETT, Superintendent Transylvania and Buncombe Test Farms, Swannanoa, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, February 15, 1911.

SIR:—I submit herewith in manuscript a report of the more general work on the Buncombe and Transylvania Test Farms, covering clearing and improvement of the land, rotation, crops and yields, building and equipment of the farms and other things which it is thought will be of general interest to the public. This report has been prepared in the main by R. W. Collett, Superintendent, and the work reported on and referred to has been carried out by him in accordance with plans made and agreed on by the Director, other Department workers doing work on the Test Farms, and Mr. Collett.

I recommend its publication as Supplement to the February BULLETIN.

Respectfully,

B. W. KILGORE,

Director of Test Farms.

To HON. W. A. GRAHAM,

Commissioner of Agriculture.

I. REPORT OF GENERAL FARM WORK ON THE BUNCOMBE TEST FARM, 1908-1910.

By R. W. COLLETT.

The Farm, Soils and Conditions.—This farm was purchased in 1908, after finding our Transylvania County farm would not meet our needs in much of the work we desired to carry out in the mountain section. This farm is on the western slope of the Blue Ridge and about five miles from the crest of the same, and is about 12 miles east of Asheville on the Asheville and Salisbury branch of the Southern Railway. The farm lies along the Swannanoa River on the south, where it has an elevation of between 2,250 and 2,300 feet and reaches back to the foothills of a spur range of the Black Mountains, being gently sloping or rolling with very little steep land on the farm. The range of elevation embraced is less than 200 feet, the land being in fact almost entirely bottom and 'so-called bench land.

This farm when purchased was one of the many run-down farms, not better or worse than the average. Most of it was in pasture, depending on native wild grasses and had been pastured so close that the ground was quite bare and gave the impression that the land was poorer perhaps than it really was. A few places had been manured for the past two years and were quite productive, but only a few acres and of them we need not speak.

The bottom land, about 100 acres, was practically all cleared and in cultivation, producing very poor crops.

The upland or "bench land" is about three-fourths wooded from which most of the merchantable timber had been cut. The present growth is pine, Spanish oak and scrub oak, indicating a thin, poor soil.

The bottom land ranges from a black muck soil to a thin sandy or gravelly loam. The black bottom land while apparently rich and from chemical analysis is rich in plant food, is not productive. We have under way extensive experiments to determine if possible means of making this land productive. The work already done indicates that drainage and the addition of quite large quantities of phosphoric acid are required. Strange to say, this land has responded but feebly to lime.



Figure 2—View of bottom land on the farm.

The upland or “bench land” is grayish loam, quite gravelly in places with a moderately stiff clay subsoil. In many places the surface soil has been entirely eroded.

The upland while producing very poor crops under ordinary treatment, or at least the treatment it was getting when purchased, responds readily to manuring and cultivation. Plowing a couple of inches deeper (only $8\frac{1}{4}$ average) in 1908, and the addition of a com-



Figure 3—View of upland on the farm.

plete fertilizer containing phosphoric acid, 11 per cent; nitrogen, 2.5 per cent, and potash, 2 per cent, applied in the drill, at the rate of 280 pounds per acre, gave an average yield of 44 bushels corn per acre, on a 16-acre field that had produced a little over five bushels of wheat per acre in 1907. This field had frequent and thorough surface tillage, seven cultivations in all after the corn came up. A check plat in the same land produced 10 bushels less per acre, where only five cultivations were given.

Handling and Improvement of the Soil and Laying Out the Work.

—Our first care in taking possession of this farm was to locate the various plats wanted for strictly experimental work, and these have had careful attention, neglecting often the general farm operations and appearances of the place that these plats might have proper care. The results of these tests have been and will be published from time to time as data are collected, and no more than a general notice will be taken of them in this report. With whatever land remained for general farming, we have attempted to carry on in accordance with the advanced idea of agriculture. However, let it be noted we have only ordinary equipment such as is found on many farms throughout the State, so that whatever success we may have had, is not due to equipment which is out of reach of ordinary farmers.

Drainage.—One of our first efforts at general farm improvement was in drainage. No funds being directly available for this work we attempted to make use of poles for underdrains. After keeping check on the expenses of this kind of drainage and also digging out old drains similarly laid we abandoned this method as being expensive and inefficient, the first cost being almost as much as tile, when the extra amount of excavation and back filling are considered. There are many cases where as a matter of expediency pole drains may be used, but any attempt at extensive drainage, especially where the fall is slight, will result in disappointment, for the obvious reason that the rough surface of the poles will check the flow of the water and allow the ditch to silt up, whereas the relative smooth surface of the tile will carry the water even faster than an open ditch. Later appropriations were secured for the purchase of tile of suitable size and since then about 5,000 feet of tile has been laid, with the result that all the old open ditches except one, which is not practicable to tile, have been covered and filled. This has added greatly to the appearance of the place, as well as to its productivity and convenience in cultivation. The time formerly lost in keeping the banks cut back, and in turning at the ditches during cultivation has been saved, and the crops produced on the land before occupied by the open ditches have in some cases already paid for the tile, to say nothing of the better drainage secured by lowering the bottom of the ditches before putting down the tile.

We have terraced about five acres and expect to terrace more. We have removed quantities of loose stone at odd times and have added fully ten acres to the cultivated land by clearing out brush, covering ditches, draining small wet spots and removing useless fences.

Buildings and Fencing.—Good woven wire fences have been put up where needed and a few outhouses built of rough timber as well as repairing a couple of tenant houses. We have expended in this about five hundred dollars.

In 1909 a dwelling was built for the Superintendent at a cost of \$3,500. This building is substantial, roomy and convenient, constructed of first-class material, roofed with slate and finished throughout in keeping with the ideas of taste and comfort of a modern farm home.

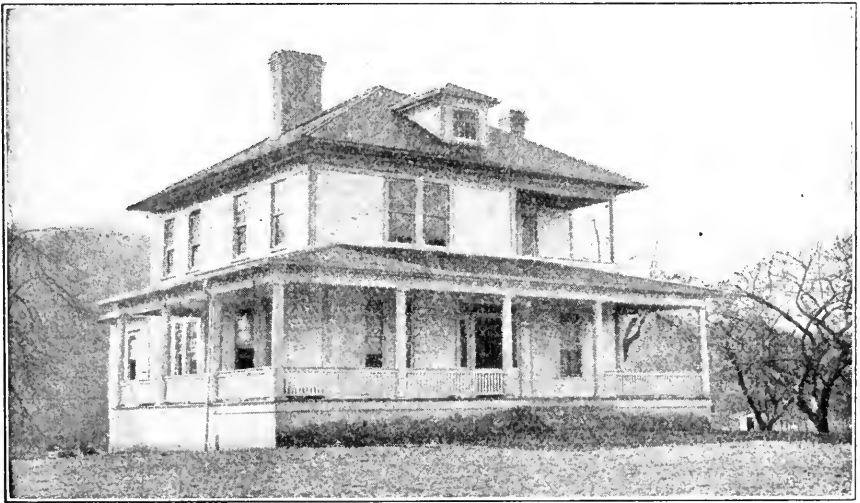


Figure 4—Residence on Buncombe farm.

A gravity system of waterworks has been installed at a cost of about \$150. The water is conveyed from a spring 1,800 feet distant to the house through 1-inch galvanized iron pipe. The supply is sufficient for domestic use, and for watering stock, with a surplus which can be used for irrigating garden and other small areas. We have done considerable work also in grading a good-sized lawn, as well as grading and straightening the roads passing through the farm, which has added much to the looks of the place.

Experiments.—The experimental work has been along substantially the same lines for the three years. Soil and crop requirements with fertilizers, variety tests of corn, wheat, oats and potatoes, cul-

ture and other tests. These results have been and will be published from time to time as sufficient reliable data are secured. In this connection we would say that there has been some impatience shown by local farmers and others, which at times is shared in a measure by the writer, but we have endeavored to lay the foundations for good, solid future work, publishing only such data as we deemed reliable rather than attempt to secure maximum yields regardless of

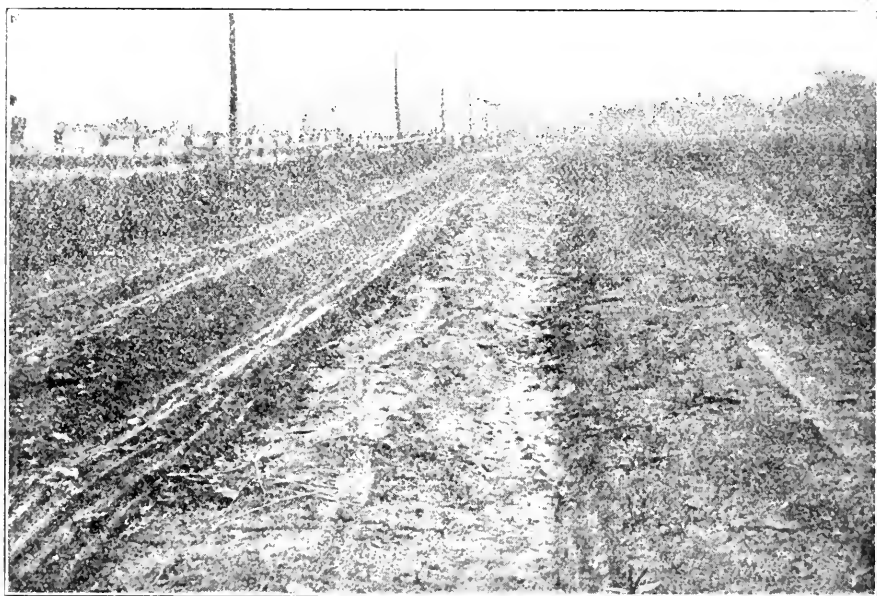


Figure 5—Grading the road adds to appearances; the uncultivated strip is used for turning and gives a cutting of hay.

cost, which we might have done, or publish results before a sufficient number of tests have been conducted, from which safe conclusions could be drawn.

Our work with fertilizers has shown, as a rule, that the soils on this farm do not respond profitably to applications of nitrogen or potash, but respond readily to applications of phosphoric acid. As an extreme example, an application of 200 pounds per acre of 14 per cent acid phosphate gave an increase of 11 bushels of oats per acre, while an application of nitrogen and potash slightly decreased the yield. Practically the same results have been secured with other crops. Two extra cultivations gave ten bushels increase of corn per acre. A difference of from 39 to 52 bushels of corn per acre was shown due to variety planted. Equally striking results in oats, wheat and potatoes have been shown due to the same factor, *i. e.*



Figure 6—Rye on black land fertilized with phosphate.

variety. These examples serve to show in a general way the character of work, but in no way indicate the multitude of detail incident to the same.

Cattle and Sheep.—We have on this farm a herd of Short Horn cattle, seven of which were purchased for the farm direct and two

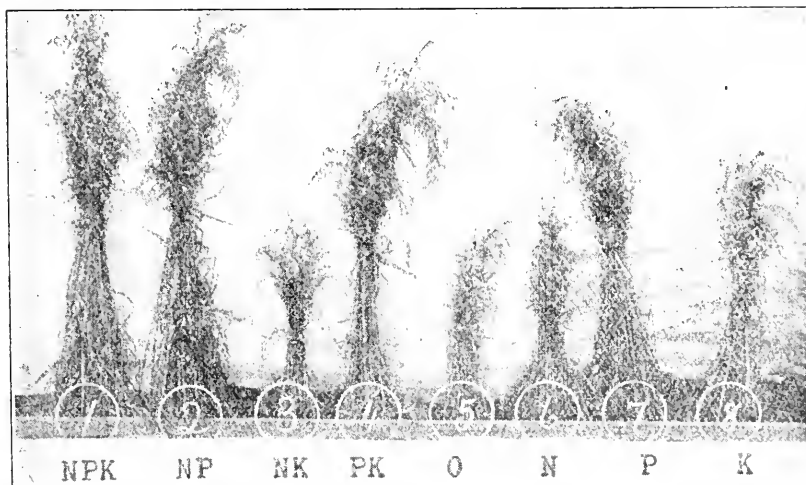


Figure 7—Showing effect of fertilizer materials on oats. N represents nitrogen; K, potash; P, phosphoric acid and O, nothing.

that were moved from the Iredell Farm. They will be used for building up a herd of beef cattle.

We also have a small flock of native ewes, upon which we are crossing a Dorsett buck with good results. A number of the lambs (grades) went to market the past summer weighing over 100 pounds live weight.

Hogs.—A small lot of Berkshire hogs have given us profitable returns and indicate a demand for pigs both for breeding and the feed lot that is far from being satisfied.

Selecting Seed Corn for Sale.—Care has been given to selecting and breeding seed corn, which has resulted in a demand for seed greater than we can supply, and, in a local interest in the subject among the farmers that has not been shown before.

Visitors and Correspondence.—We have had comparatively few visitors as yet, but these have been from widely scattered sections. but the interest shown by neighboring farmers has been constant, the results of certain sets of experiments having been watched throughout the season by interested parties. Some have asked to be notified when certain plats were to be harvested in order that they might be present to compare results.

The correspondence has been quite large, answering special inquiries. This feature of the work has been given as careful attention as possible.

Publications.—We have now in course of preparation papers dealing with farm drainage, the culture of corn and potatoes in the mountain sections, which papers embrace the results of our corn variety and culture work and potato variety and fertilizer work, with the special treatment of potato diseases and insect enemies and the methods we have used in combating them.

We have also another paper with numerous illustrations showing the methods by which the old orchard on the farm has been improved and made to produce fruit abundantly.

New Buildings.—Preparations are being made to erect a barn and an office and storage building which will greatly facilitate work, as well as add to the appearance of the farm. We are at present (spring of 1911) cutting timber from our wood lot and sawing same on the farm, which it is hoped will materially reduce the cost of our buildings. We are also cutting the wood and brush clean from about 20 acres of our woodland with the view of putting the land in grass for pasture, and after pasturing for a few years clear same of stumps and use for cultivated crops. We expect to follow this practice of cutting over about 20 acres yearly until we have added another 100 acres to our farming land.

II. REPORT OF GENERAL FARM WORK ON THE TRANSYLVANIA TEST FARM, 1905-1910.

By R. W. COLLETT.

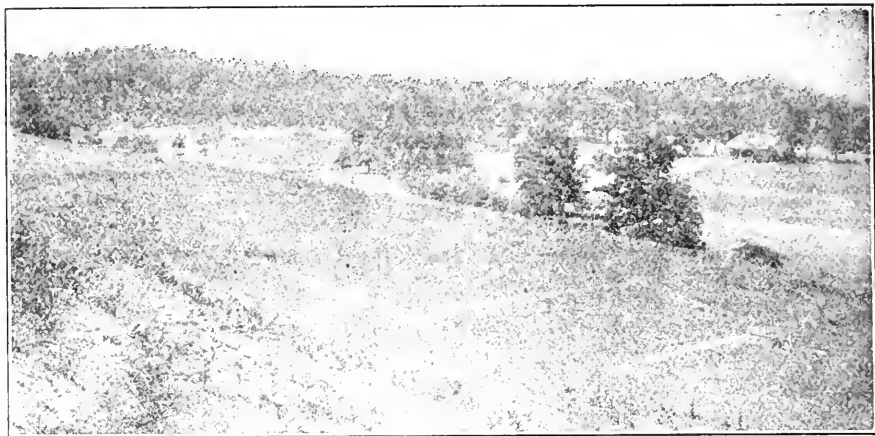
This farm, consisting of about 40 acres of bottom and sloping upland, and about 250 acres of steep mountain sides, lies along the French Broad River on the east and stretches back into the hills on the west. The elevation of the farm ranges from 2,200 feet at the river to about 3,000 feet on the mountain top.

Most of the bottom land is subject to overflow and much of the rest is too steep to cultivate. Other than the overflow portion, the farm represents the average mountain farm. This farm was purchased in 1904, and a suitable barn, a neat four-room cottage and two houses for labor were erected, largely from timber grown on the farm.

Equipment.—Only a small amount of tools and machinery were purchased and at no time have we expended more than does the average well-to-do farmer. The only expenses we have had since buying our equipment has been for labor and fertilizers. Our equipment for this farm consists of a wagon and team, good turning plows, two Planet Jr. cultivators, a hillside plow, two-horse walking cultivator, disc and smoothing harrow, mowing machine and rake and other things of smaller importance. The farmer who has his tools, teams, etc., is just as well prepared to improve his farm as we were.

Appearances.—This farm was at one time productive, but under tenant farming had almost become unprofitable, with the exception of the bottom land. The sloping land was washed badly, brush and briars had grown up along ditch banks and roadsides. Fences were in bad condition and scraggy apple trees occupied much valuable space.

We started out with the definite idea in view of making every part of the land on this farm productive of something, either forest, orchard, pasture or cultivated crops. Scattering trees and useless fences have been removed, brush and briars cut away, wet places drained, hillsides terraced and washes filled in. All of this work was done at odd times, while the other farm work was being carried on. A farm without attention of this kind never gives maximum returns.



It is impossible for us to recommend a definite method by which such improvements may be accomplished, but we advise that every farmer do these things at odd times. We have always back-furrowed our fields, and in this way have turned the unused oil along the borders and on ditches back into the field. A great deal can be added by this practice to the yield as well as the looks of a field.

We have straightened a pasture fence throwing all of the branch into the pasture.

The fence originally followed the windings of the branch.



Rotations and Soil Improvement.—In our work it has been necessary to have many different rotations and many small fields, both of which is bad practice for general farming.

With fields as large as possible and a well-planned rotation, in which clover or some other soil-improving crop occurs rather frequently, together with what live stock the farm will profitably carry, one will succeed in building up a farm under ordinary conditions, perhaps much faster than the following plan which we have followed on one field of about 8 acres. In this experiment we have kept in mind the fact that feed enough can not be grown on a run-down farm to make enough manure to either build it up or to maintain its present state of fertility. All of the crop can not be returned to the soil, and if feed is bought, although it may be fed at a profit and the farm built up, the farm the feed came from is running down. So that "the permanent prosperity of Agriculture" depends upon other factors as well as stock raising.

Some farmers must produce crops and produce them profitably and the fertility of the soil must be maintained, if not increased, or else there is no permanent agricultural prosperity.

In view of this, our experiment on the 8 acres mentioned above is worth special mention as the conditions have been severe in the extreme. The field in question was run down to where profitable crops could not be grown. It had been grown to corn continuously with an occasional crop of rye, for forty or fifty years, with little or no manure. Our cultural treatment and fertilizer application, has remained practically the same since 1905, the beginning of the experiment.

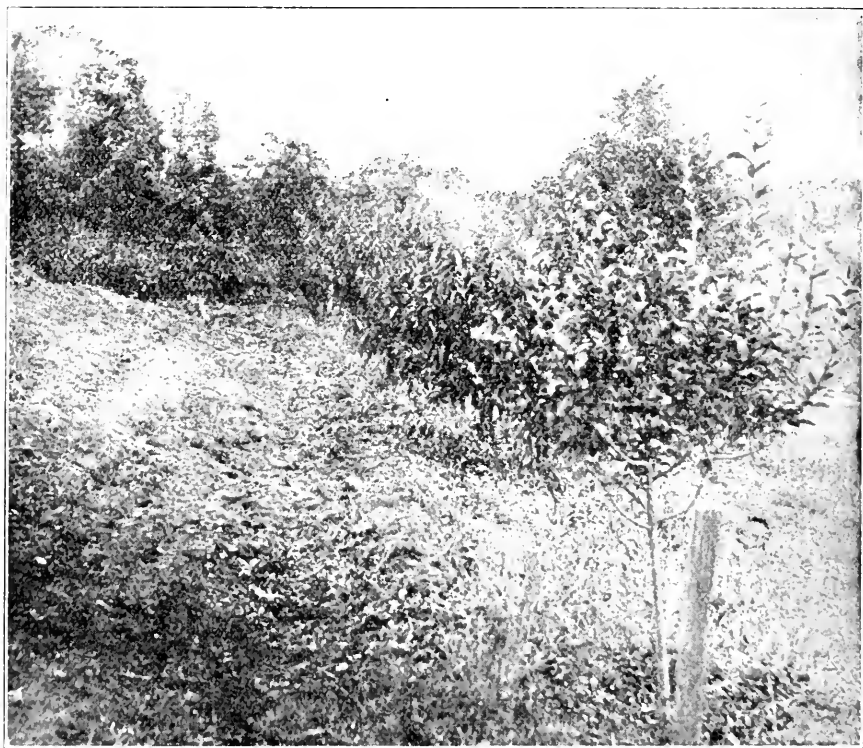
The ground was plowed to a depth of about 8 inches, followed by frequent and thorough tillage throughout the growing season. With this treatment, excepting the plowing, which was not deep enough, should have resulted in larger yields than we have secured had the land been moderately productive in the beginning. The yield the first year was about 16 bushels corn per acre. At the last cultivation of the corn crop, crimson clover was sown at the rate of 12 pounds seed per acre, which resulted the first year in a very poor stand and growth. This was plowed under late in April of the following spring and corn planted in May.

The results from the 8-acre experiment are as follows: In 1906 16 bushels of corn per acre, which is less than the cost of production. In 1909, 39 bushels were produced per acre, a crop that showed a profit.

This shows the value of clover as a soil-improving crop and that the productivity of the soil can be maintained and increased without stable manure.

In connection with this experiment we are trying rather heavy applications of phosphate rock, by which we hope to increase our yields at a minimum of expense. We have also done some subsoiling, but since the above yields were obtained. We have other rotations and practice methods different from this on other fields, but this has given the most striking results.

Orchard and Forestry.—The orchard and forestry work is of importance also. About 16 acres of steep land has been cleared and planted to apples, peaches, cherries and plums, many varieties of



each. From this work it is expected to secure data in regard to varieties and cultural methods, as sod, clean culture and intercropping, also data in regard to air drainage, as affecting frost damage, by means of self-recording instruments. We expect to secure valuable data for the fruit grower as a result of this work.

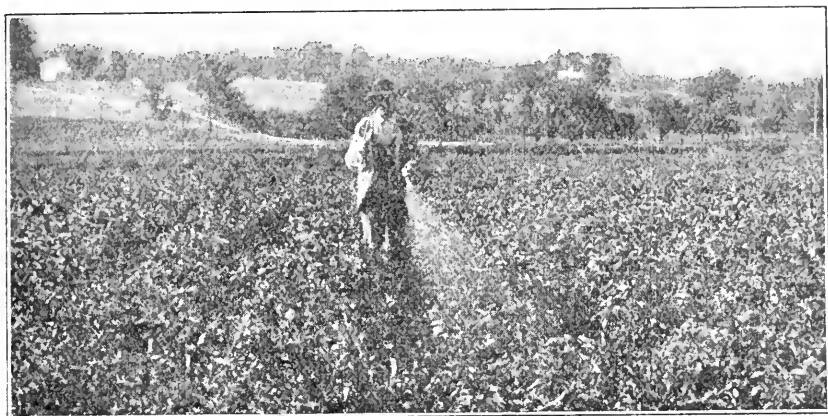
The woodland is being handled with the view of getting continuous return from the forest products. The forest land at present is paying a fair return on the investment from the sale of extract

wood, saw timber, bark, etc., and we believe that our present rate of cutting will be continuous.

Live Stock.—We are not handling a very large amount of live stock on the farm. A small flock of sheep, and from three to five brood sows are kept on the farm.

The experience of the present summer indicates that our combined pasture and woodland will furnish only limited amount of pasture, perhaps less than one sheep per acre, and as for pigs, it does little more than furnish a runaway lot, with perhaps a benefit from grubs and worms picked up which serve to balance the ration.

Giving the pigs the run of our 5-year-old sod orchard has resulted in mitigating the damage from mice with little or no damage to trees from the pigs.



Spraying potatoes.

The Farm an Object Lesson.—On the whole we think this farm has amply justified its existence as a test farm, and the plans for the future ought to make it more valuable. Costing as it does very little above operating expenses, besides improvements in the way of fences, roads, ditches, buildings, etc., that have been added from year to year together with the increased value of farm lands, so that on the whole, the investment is a good one from a financial standpoint alone. If no loss to our crops for the present year should be sustained, we will show a profit over operating expenses.

This farm can be carried with profit to the community and the State as an object lesson in what may be done without considerable outlay, with the added value of all strictly experimental data we may secure.

Our familiarity with the apple growing sections of the western part of the State, leads us to think a more suitable location as to soil, slope, etc., can not be secured than that we have on this farm.

This farm was established mainly for the conduct of experiments. The overflow of the French Broad River interfered now and then with this kind of work on the valley land. On this account the Buncombe farm was obtained in 1908 for use in work of a more strictly experimental nature, and this—the Transylvania farm—retained for more general work as indicated by the above report. The farm is being made an object lesson in good farming for the section, including methods and implements of good tillage, better kinds of seeds, soil improvement by rotations and proper fertilization, the prevention of washing, preservation and utilization of forest products, etc.

In addition to the above considerable information of an experimental nature has been obtained as to the kind and amount of fertilizers needed for best results with Irish potatoes, corn and grains on this soil; (analyses show this soil to be very high in potash and field tests indicate that little or no potash is required in fertilizers, phosphoric acid being the most efficient constituent) the effect of liming, the kinds or varieties of corn, Irish potatoes and oats best suited to the soil and section, etc. These results have been or will be published from time to time in special reports dealing with these different phases of the work.

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I. ANALYSES OF FERTILIZERS—SPRING SEASON, 1911.

II. REGISTRATION OF FERTILIZERS.

*Library New York Botanical
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I. ANALYSES OF FERTILIZERS—SPRING SEASON, 1911.

BY B. W. KILGORE,

W. G. HAYWOOD, J. M. PICKEL, J. Q. JACKSON AND W. H. STROWD.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the spring months of 1911. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural state, the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them.

They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate (as the costs of fertilizing materials are liable to change, as other commercial products are), but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and

potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1910.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano	3½	cents per pound.
For nitrogen	18	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid.....	4½	cents per pound.
For nitrogen	19½	cents per pound.
For potash	5½	cents per pound.

VALUATIONS FOR 1911.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag and Peruvian guano	3½	cents per pound.
For nitrogen	19½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid.....	4½	cents per pound.
For nitrogen	21	cents per pound.
For potash	5½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percentage or Lbs. in 100 Lbs.</i>	<i>Value Per 100 Lbs.</i>	<i>Value Per Ton, 2,000 Lbs.</i>
8 pounds available phosphoric acid at 4½ cents...	0.36 × 20 =	\$ 7.20
2 pounds potash at 5½ cents.....	0.11 × 20 =	2.20
1.65 pounds nitrogen at 21 cents.....	0.347 × 20 =	6.94
Total value.....	0.817 × 20 =	\$16.34

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance.....	\$ 3.20	\$ 3.20	\$ 3.40.	\$ 3.20
Apex.....	2.70	-----	3.80	3.00
Ashboro.....	3.20	3.20	3.60	3.20
Asheville.....	4.00	4.00	4.00	4.00
Chapel Hill.....	2.95	3.20	3.90	3.20
Charlotte.....	2.65	3.20	2.85	3.20
Clayton.....	2.48	2.86	3.63	2.80
Cherryville.....	3.85	3.60	3.40	3.63
Clinton.....	1.60	3.00	3.20	3.00
Creedmoor.....	3.00	3.00	3.80	3.00
Cunningham.....	3.00	2.40	4.00	2.40
Dallas.....	3.00	3.60	3.40	3.60
Davidson College.....	3.00	3.20	3.20	3.20
Dudley.....	1.70	3.00	3.20	3.00
Dunn.....	2.00	2.80	3.20	2.80
Durham.....	2.80	2.83	3.20	2.83
Elkin.....	3.60	3.20	3.60	3.20
Elm City.....	2.10	2.60	3.20	2.60
Fair Bluff.....	1.60	3.80	2.40	3.80
Fayetteville.....	1.80	3.00	3.00	3.00
Forestville.....	2.85	3.00	3.80	3.06
Gastonia.....	3.12	3.25	3.12	3.25
Gibson.....	2.10	3.50	2.10	3.50
Goldsboro.....	1.80	2.80	3.20	2.80
Greensboro.....	2.96	3.00	3.40	3.00
Hamlet.....	2.00	3.00	3.60	3.00
Henderson.....	3.00	2.83	3.55	2.83
Hickory.....	3.20	3.60	3.20	3.60
High Point.....	3.00	3.08	3.40	3.08
Hillsboro.....	2.88	2.88	2.68	2.88
Kernersville.....	3.00	3.00	3.40	3.00
Kinston.....	2.10	2.80	3.50	2.80
Laurel Hill.....	1.90	2.40	3.80	3.40
Laurinburg.....	1.90	3.40	3.80	3.40
Liberty.....	2.72	3.60	3.80	3.60
Louisburg.....	2.95	3.00	3.80	3.00
Lumberton.....	1.60	3.60	3.70	3.60
Macon.....	3.05	3.00	3.85	3.00
Madison.....	3.00	3.00	3.40	3.00
Matthews.....	2.60	3.20	3.20	3.20
Maxton.....	1.80	3.40	2.70	3.40
Milton.....	3.44	2.40	4.00	2.40
Mocksville.....	3.36	3.20	3.40	3.20
Morven.....	2.55	3.60	2.50	3.60
Mount Airy.....	3.20	3.40	3.80	3.40
Nashville.....	2.30	2.90	3.40	2.90
New Bern.....	1.25	1.75	3.95	1.75
Norwood.....	3.68	3.20	3.20	2.23
Oxford.....	3.04	2.83	3.55	2.83
Pineville.....	2.77	3.25	3.00	3.20
Pittsboro.....	2.60	3.30	4.10	3.30
Polkton.....	2.40	3.00	2.20	3.00
Raleigh.....	2.56	2.83	3.40	2.83
Reidsville.....	3.00	2.96	3.40	2.36
Rockingham.....	2.10	3.00	3.80	3.00
Rocky Mount.....	2.20	2.50	3.40	2.50
Ruffin.....	3.28	2.80	3.40	2.20
Rural Hall.....	3.28	3.20	3.60	3.20
Rutherfordton.....	3.05	3.65	3.05	3.65
Salisbury.....	3.25	3.20	3.20	3.20
Sanford.....	2.10	3.00	3.40	3.00
Selma.....	2.10	2.80	3.20	2.80
Shelby.....	2.90	3.60	3.90	3.60
Siler City.....	2.60	3.60	3.80	3.60
Smithfield.....	2.20	2.80	3.20	2.80
Statesville.....	3.50	3.20	3.60	3.20
Stem.....	2.95	2.83	3.80	2.83
Tarboro.....	2.30	2.40	3.00	2.40
Waco.....	2.90	3.60	3.40	3.60
Wadesboro.....	2.30	3.00	2.50	3.00
Walnut Cove.....	3.00	3.00	3.40	3.00
Warrenton.....	3.05	3.25	4.10	3.25
Warsaw.....	1.50	3.00	3.20	3.00
Washington.....	2.65	1.75	2.25	1.50
Weldon.....	2.95	1.90	3.85	1.90
Wilson.....	2.00	2.60	3.20	2.60
Winston-Salem.....	3.00	3.00	3.40	3.00

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.						Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.		
MIXED FERTILIZERS.											
Brand claiming.					8.00			1.65	2.00	1.50	\$ 15.83
8989	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture.	Shelby	9.25	1.02	.56	1.58	1.92	1.51	16.62	
Brands claiming.				8.00			1.65	2.00	2.00	16.34	
8844	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Base and Potash Compound for All Crops.	Beston	14.00	.74	1.08	1.82	2.21	2.14	22.60	
8925	Cooper Guano Co., Wilmington, N. C.	Cooper's Sterling Complete Guano	Wilmington	9.36	1.12	.52	1.64	1.99	2.44	18.00	
8821	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Mount Gilead	8.54	.96	.86	1.82	2.21	2.43	18.00	
8861	Harrell, S. B., & Co., Norfolk, Va.	Harrell's Champion Cotton and Peanut Guano.	Edenton	8.44	1.14	.56	1.70	2.70	1.93	16.86	
8813	Martin, D. B., Co., Richmond, Va.	Martin's Carolina Cotton Fertilizer.	New Bern	8.54	.52	1.22	1.74	2.11	2.06	17.26	
8847	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Cotton Guano.	Beston	16.48	.92	.96	1.88	2.29	2.79	25.80	
8893	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton Fertilizer.	Lumberton	8.37	.60	1.06	1.66	2.02	2.78	17.56	
8986	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special Cotton Compound.	Cherryville	8.11	.88	.82	1.70	2.07	2.04	16.68	
4306	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Cultivator.	Edenton	7.71			1.34	1.63	3.23	16.11	
8983	Robertson Fertilizer Co., Norfolk, Va.	Double Dollar Guano.	Moorestboro	8.72	1.06	.50	1.56	1.89	1.79	16.37	
8838	Union Guano Co., Winston, N. C.	Old Honesty Guano.	Wadesboro.	8.65	.56	1.24	1.80	2.19	2.52	18.12	
8801	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Virginia Fertilizer Co.'s Eureka.	Raleigh	9.12	2.02	.56	2.58	3.14	2.28	21.55	
8954	do.	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Lumberton	8.92	.48	1.30	1.78	2.16	2.07	17.78	
8800	do.	Farmers' Favorite Fertilizer.	Raleigh	8.39	.86	1.34	2.20	2.67	2.34	19.28	

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Name and Address of Manufacturer.				Name of Brand.		Where Sampled.						Percentage Composition or Parts per 100.						
Laboratory Number.																		
MIXED FERTILIZERS.																		
Brands claiming																		
8873	Va.-Car. Chemical Co., Richmond, Va.						Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Guano.						Wadesboro.					
8916	do.						Plant Food						Whiteville.					
8938	do.						Powers, Gibbs & Co.'s C. S. M. Soluble Ammoniated Guano.						Roseboro.					
8921	do.						Travers & Co.'s Beef, Blood and Bone Fertilizer.						Whiteville.					
Brands claiming																		
8810	Hubbard Guano Co., Baltimore, Md.						Hubbard's Fish Compound						New Bern.					
8926	N. C. Cotton Oil Co., Wilmington, N. C.						Wilmington Banner						Wilmington.					
Brand claiming																		
8894	Navassa Guano Co., Wilmington, N. C.						Ammoniated Soluble Navassa Guano.						Lumberton					
Brands claiming																		
8984	Richmond Guano Co., Richmond, Va.						Tip Top Fertilizer						Shelby					
8918	Va.-Car. Chemical Co., Richmond, Va.						Durham Fert. Co.'s Farmers' Alliance Guano.						Whiteville.					
Brand claiming																		
8976	Imperial Guano Co., Norfolk, Va.						Martin County Special Crop Grower.						Williamston.					
Brand claiming																		
8969	Hadley, Harris & Co., Wilson, N. C.						Hadley's Boss Guano.						Wilson.					

Brands claiming		8.00	2.47	3.00	2.00	19.77
8846	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	8.99	1.08	1.36	2.97	20.89
8830	N. C. Cotton Oil Co., Wilmington, N. C.	8.41	1.06	1.40	2.99	20.25
8802	Va.-Car. Chemical Co., Richmond, Va.	9.52	1.80	.74	3.09	22.36
Brands claiming		8.00	2.47	3.00	3.00	20.89
8911	Acme Mfg. Co., Wilmington, N. C.	8.77	1.84	.64	3.02	21.93
8856	American Agricultural Chemical Co., New York, N. Y.	8.61	1.68	.86	3.09	22.02
8988	American Fertilizer Co., Norfolk, Va.	9.92	1.54	.60	2.60	20.72
8831	Baugh & Sons Co., Norfolk, Va.	8.22	1.76	.84	3.16	22.08
8924	Cooper Guano Co., Wilmington, N. C.	8.34	1.88	.68	3.11	21.92
8819	Farmers Cotton Oil Co., Wilson, N. C.	8.29	1.00	1.56	3.11	22.30
8883	Farmers Guano Co., Raleigh, N. C.	7.20	1.16	1.30	4.53	21.79
8822	Floradora Guano Co., Lynchburg, Va.	8.87	.96	1.44	2.92	22.34
8943	Hampton Guano Co., Norfolk, Va.	8.22	1.86	.66	3.06	21.79
8832	Interstate Chemical Corporation, Charleston, S. C.	8.17	1.22	1.26	3.02	21.24
8891	Lamberton Cotton Oil and Ginning Co., Lamberton, N. C.	8.25	1.20	1.64	3.45	23.59
8812	Martin, D. B., Co., Richmond, Va.	8.25	1.46	.76	2.70	20.05
8834	Navassa Guano Co., Wilmington, N. C.	8.43	1.52	1.24	3.36	23.30
8927	N. C. Cotton Oil Co., Wilmington, N. C.	8.24	.88	1.60	3.02	21.71
8848	Pamlico Chemical Co., Washington, N. C.	8.55	1.03	1.76	3.45	23.87
8871	Piedmont-Mount Airy Guano Co., Baltimore, Md.	8.07	1.40	1.16	3.11	21.81
8852	Powhatan Chemical Co., Richmond, Va.	8.19	1.40	1.12	3.06	21.62
8905	Pocomoke Guano Co., Norfolk, Va.	8.57	1.94	.70	3.21	22.20
8836	Richmond Guano Co., Richmond, Va.	8.02	1.52	1.06	3.14	21.56
8933	Southern Exchange Co., Maxton, N. C.	8.14	1.96	.64	3.16	22.05
8971	do	8.08	1.90	.70	3.16	22.03
	Caraleigh Pacific Tobacco and Cotton Grower, LaGrange, Wilmington.					
	Pate's Special, Wilmington.					
	Durham Fertilizer Co.'s L. and M. Special, Raleigh.					
	Pee Dee Special Fertilizer, Chadbourn.					
	Lazaretto Special Tobacco and Potato Fertilizer, Edenton.					
	American Eagle Guano, Shelby.					
	Baugh's Grand Rapid High Grade Truck Guano, Wadesboro.					
	Cooper's Lenox, Wilmington.					
	Golden Gem Guano, Selma.					
	Golden Grade Guano, Kinston.					
	Oseola, Fayetteville.					
	Princess Prolific Producer, Clinton.					
	Honest Queen High Grade Guano, Rockingham.					
	Silver Dollar, Lamberton.					
	Martin's Bull Head Fertilizer for Cotton and Tobacco, New Bern.					
	Navassa High Grade Guano, Rockingham.					
	Wilmington High Grade Guano, Wilmington.					
	Success Guano, Bayboro.					
	Piedmont High Grade Ammoniated Bone and Potash, Wadesboro.					
	P. C. Co.'s Hustler, LaGrange.					
	Harvey's High Grade Monarch, Edenton.					
	Gilt Edge Fertilizer, Rockingham.					
	Comet Cotton Compound, Wilmington.					
	Jack's Best Fertilizer, Maxton.					

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.						Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	
MIXED FERTILIZERS.										
Brands claiming										
8872	Union Guano Co., Winston, N. C.	Union Homestead Guano.	Wadesboro	8.00	1.34	1.04	2.38	3.00	3.00	\$ 20.89
8797	Va.-Car. Chemical Co., Richmond, Va.	Blake's Best.	Raleigh	8.29	1.30	1.18	2.48	3.02	3.35	22.14
8839	do.	Durham Fertilizer Co.'s Gold Medal Brand Guano.	Rockingham	10.57	.86	1.40	2.26	2.75	3.63	21.56
Brands claiming										
8932	N. C. Cotton Oil Co., Wilmington, N. C.	Bullock's Cotton Grower.	Wilmington	8.00	1.14	1.66	2.80	3.00	4.00	23.00
8955	Va.-Car. Chemical Co., Richmond, Va.	Farmers' Success	Lumberton	9.05	1.98	.58	2.56	3.11	4.19	21.97
Brand claiming										
8912	Baugh & Sons Co., Norfolk, Va.	Baugh's Fruit and Berry Guano.	Chadbourn	8.00	1.52	1.06	2.58	3.00	10.00	23.67
Brands claiming										
8945	Acme Mfg. Co., Wilmington, N. C.	Quickstep Fertilizer.	Roseboro	8.01	1.60	1.62	3.29	4.00	10.00	29.07
8952	Arps, G. L., Norfolk, Va.	Arps' Go-a-Head Guano for Truck, Cotton and Tobacco	Roper	7.57	2.54	.66	3.22	3.91	4.46	25.42
8913	Baugh & Sons Co., Norfolk, Va.	Baugh's Fish, Bone and Potash.	Chadbourn	8.80	2.08	1.24	3.20	3.89	3.98	25.74
8958	Bryant Fertilizer Co., Alexandria, Va.	Bryant's High Grade Guano.	Lumberton	8.59	2.08	1.24	3.32	4.04	4.10	26.18
8892	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	Gold Dollar.	Lumberton	8.12	1.24	2.14	3.38	4.11	4.04	25.95
8814	Martin, D. B., Co., Richmond, Va.	Martin's Red Star Brand Fertilizer.	New Bern	8.39	1.06	1.84	2.90	3.53	4.66	24.86
8896	Navassa Guano Co., Wilmington, N. C.	Navassa Special Truck Guano.	Lumberton	8.17	3.26	.22	3.48	4.23	4.97	27.43
				8.25	1.30	1.94	3.24	3.94	3.94	25.37

8833	do.....do.....	Rockingham.....	9.38	1.54	1.36	2.90	3.53	3.12	24.05
8931	N. C. Cotton Oil Co., Wilmington, N. C.....	Bullock's High Grade Guano.....	8.13	1.60	1.62	3.22	3.91	4.85	26.17
8885	Ober, G., & Sons Co., Baltimore, Md.....	Ober's High Grade Fertilizer.....	8.17	2.24	1.06	3.30	4.01	4.92	26.62
8886	Povhatan Chemical Co., Richmond, Va.....	North State Special.....	9.49	1.86	1.26	3.12	3.79	3.38	25.36
8970	Southern Exchange Co., Maxton, N. C.....	Two Fours Guano.....	8.22	1.12	1.24	3.36	4.09	4.36	26.31
8837	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Monarch High Grade Guano.....	8.64	1.38	1.88	3.26	3.96	3.73	25.57
	Brand claiming.....		9.00			.82	1.00	3.00	14.84
8985	Patapsco Guano Co., Baltimore, Md.....	Coon Brand Guano.....	9.72	.54	.38	.92	1.12	2.81	15.70
	Brand claiming.....		9.00			1.65	2.00	3.00	18.33
8845	Craven Chemical Co., New Bern, N. C.....	Prolix Special Guano.....	8.61	.70	.94	1.64	1.99	3.34	18.31
	Brands claiming.....		9.00			2.26	2.75	2.00	19.79
8870	MacMurphy Co., Charleston, S. C.....	Wilcox, Gibbs & Co.'s Manipulated Guano.....	9.40	.90	1.60	2.50	3.04	2.52	21.73
8928	N. C. Cotton Oil Co., Wilmington, N. C.....	Wilmington Prolific Crop Grower.....	9.17	1.04	1.38	2.42	2.94	2.63	21.27
8967	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's Meal Mixture.....	9.14	.76	1.62	2.38	2.89	2.51	20.98
8975	Va.-Car. Chemical Co., Richmond, Va.....	White Steam.....	9.75	.46	1.56	2.18	2.65	2.25	20.41
	Brands claiming.....		9.00			2.47	3.00	3.00	21.77
8987	Ober, G., & Sons Co., Baltimore, Md.....	Ober's Special High Grade Fertilizer.....	10.55	1.78	.68	2.46	2.99	3.05	23.18
8824	Va.-Car. Chemical Co., Richmond, Va.....	N. & R.'s Best.....	9.77	2.10	.54	2.64	3.21	2.99	23.17
	Brand claiming.....		7.00			3.29	4.00	8.00	28.96
8859	Baugh & Sons Co., Norfolk, Va.....	Glover's Special Potato Guano.....	8.51	2.52	.98	3.50	4.26	7.89	31.04
	Brands claiming.....		7.00			4.12	5.00	5.00	29.00
8902	Pamlico Chemical Co., Washington, N. C.....	Pamlico Favorite Potato Guano.....	8.14	1.80	2.48	4.28	5.20	6.19	32.11
8907	Pocomoke Guano Co., Norfolk, Va.....	Standard Truck Guano.....	7.55	3.24	1.10	4.34	5.28	5.28	30.83
	Brands claiming.....		7.00			4.12	5.00	7.00	31.30
8885	Navassa Guano Co., Wilmington, N. C.....	Navassa Root Crop Fertilizer.....	8.55	1.72	1.80	3.52	4.28	5.60	28.64
8951	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.....	Ives' Irish Potato Guano.....	8.84	3.04	1.40	4.41	5.40	7.07	34.38

ANALYSES OF COMMERCIAL FERTILIZERS SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	
				7.00	2.02	1.10	4.12	5.00	8.00
				8.19	2.02	1.10	3.12	3.79	6.11
				7.00			5.76	7.00	7.00
				6.80	4.52	1.34	5.86	7.12	7.73
				6.00			4.12	5.00	7.00
				6.41	3.30	.88	4.18	5.08	7.28
				8.05	1.60	2.24	3.84	4.67	7.84
				6.30	3.00	1.16	4.16	5.06	6.98
				6.00			4.94	6.00	6.00
				6.71	4.66	.60	5.26	6.40	7.96
				5.00			8.25	10.00	2.50
				6.43	4.40	2.18	6.58	8.00	2.54
				5.97	5.92	2.50	8.42	10.24	3.82
				10.00					2.00
				10.09					1.66
				10.87					1.70

MINED FERTILIZERS.

8818	Brand claiming Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Great Potato Guano	New Bern						\$ 32.40
8817	Brand claiming Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Great Cabbage Guano	New Bern						27.18
8857	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Peruvian Guano Substitute for Potatoes and all Veg's.	Hertford						38.19
8860	Eastern Cotton Oil Co., Hertford, N. C.	Nun-Such Potato Grower	Elizabeth City						39.23
8862	Miller Fertilizer Co., Baltimore, Md.	High Grade Potato Fertilizer	Elizabeth City						30.40
8901	Brand claiming Mapes Formula and Peruvian Guano Co., New York, N. Y.	Mapes' Vegetable Manure	Washington						31.36
8907	Brand claiming Craven Chemical Co., New Bern, N. C.	Craven Chemical Co.'s Truck Guano.	Vanceboro						32.00
8849	Pamlico Chemical Co., Washington, N. C.	Cowell's Great Cabbage Grower	Washington						30.82
8992	Brand claiming Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Cherryville						32.75
8994	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Mammoth Corn Grower.	Salisbury						36.89

[illegible]

RAW OR UNMIXED FERTILIZER MATERIALS.

Brand claiming		13.00	10.40
88805	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Double Bone, Extra Strong. Raleigh	14.73
Brands claiming			
88826	Acme Mfg. Co., Wilmington, N. C.	Acme High Grade Acid Phosphate. Fayetteville	14.43
88899	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Acid Phosphate. Lumberton	14.56
88827	Farmers Guano Co., Raleigh, N. C.	14 Per Cent Acid Phosphate. Mount Gilcard	14.99
88828	Martin, D. B., Co., Richmond, Va.	Marin's Acid Phosphate. Fayetteville	14.49
89000	Navassa Guano Co., Wilmington, N. C.	Navassa Acid Phosphate, 14 Per Cent. Lumberton	14.98
89381	Nitrate Agencies Co., New York, N. Y.	High Grade Acid Phosphate. Williamston	14.47
88874	Union Guano Co., Winston, N. C.	Union High Grade Acid Phosphate. Wadesboro	14.79
88876	Union Abattoir Co., Baltimore, Md.	Acid Phosphate. Wadesboro	14.46
88878	Va.-Car. Chemical Co., Richmond, Va.	Norf. and Car. Chem. Co.'s Norfolk Reliable Acid Phosphate. Wadesboro	14.94
Brands claiming			
88864	Baugh & Sons Co., Philadelphia, Pa.	Baugh's 16 Per Cent Acid Phosphate. Elizabeth City	16.62
89065	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	16 Per Cent Acid Phosphate. Fayetteville	16.45
89310	Pamlico Chemical Co., Washington, N. C.	Pamlico 16 Per Cent Acid Phosphate. Washington	16.33
89900	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate. Shelby	16.00
89337	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate. Wilmington	16.27
88806	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Connet 16 Per Cent Acid Phosphate. Raleigh	16.01

II. BRANDS REGISTERED, SEASON 1910-1911.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Raw Bone Meal.....Total	20.25	3.71	....
Atlantic High Grade 16 Per Cent Acid Phosphate	16.00	....	....
Atlantic 14 Per Cent Acid Phosphate.....	14.00	....	....
Atlantic Dissolved Bone	13.00	....	....
Atlantic Acid Phosphate	12.00	....	....
Atlantic 10 and 5 Bone and Potash Mixture..	10.00	....	5.00
Atlantic 10 and 4 Bone and Potash Mixture..	10.00	....	4.00
Atlantic Bone and Potash for Grain.....	10.00	....	3.00
Atlantic Bone and Potash Mixture.....	10.00	....	2.00
Atlantic Meal Compound.....	9.00	2.27	2.00
Atlantic Cotton Grower	9.00	2.06	1.00
Corona Cotton Compound.....	9.00	1.65	3.00
Atlantic Special Guano	9.00	1.65	1.00
Atlantic Special Truck Guano.....	8.00	3.30	4.00
Oriental High Grade Guano.....	8.00	3.30	4.00
Paloma Tobacco Guano	8.00	3.30	4.00
Boon's Special Guano.....	8.00	2.47	4.00
Atlantic High Grade Tobacco Guano.....	8.00	2.47	3.00
Atlantic High Grade Cotton Guano.....	8.00	2.47	3.00
Atlantic Tobacco Grower.....	8.00	2.06	3.00
Atlantic Tobacco Compound	8.00	2.06	2.00
Atlantic Special Wheat Fertilizer.....	8.00	1.65	2.00
Atlantic Soluble Guano	8.00	1.65	2.00
Apex Peanut Grower.....	8.00	1.02	4.00
Atlantic 8 and 5 Bone and Potash Mixture..	8.00	....	5.00
Atlantic 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Atlantic 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Atlantic Potato Guano	7.00	4.12	5.00
Perfection Peanut Grower.....	7.00	....	5.00
Atlantic Side Dresser	4.00	8.22	4.00
Atlantic Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Atlantic Top Dresser .....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>Geo. L. Arps & Co., Norfolk, Va.—</i>			
Arps' H. G. 16 Per Cent Acid Phosphate....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Arps' 10 and 2 Bone and Potash Mixture....	10.00	....	2.00
Arps' "Go-a-Head" Guano for Trucks, Cotton and Tobacco	8.00	3.30	4.00
Arps' Tobacco Guano.....	8.00	2.47	3.00
Arps' Quick Growth for All Crops.....	8.00	2.47	3.00
Arps' Premium Guano for Cotton, Tobacco and All Spring Crops.....	8.00	1.65	2.00
Geo. L. Arps & Co.'s Big Yield Guano.....	8.00	1.65	2.00
Arps' Standard Truck Guano.....	7.00	4.12	5.00
Arps' Potato Guano.....	6.00	5.76	5.00
Arps' Scuppernong Guano for Trucks.....	6.00	4.12	7.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Atlantic Fertilizer Company, Atlanta, Ga.—</i>			
Atlantic "X" High Grade Acid Phosphate....	16.00	....	....
Atlantic "O" High Grade Acid Phosphate....	14.00	....	....
Atlantic "I" Standard Grade Acid Phosphate....	13.00	....	....
Atlantic "A" High Grade Guano.....	10.00	2.47	3.00
Atlantic "G" High Grade Guano.....	10.00	1.65	2.00
Atlantic "K" High Grade Phosphate and Potash.....	10.00	....	4.00
Atlantic "M" Standard Grade Phosphate and Potash.....	10.00	....	2.00
Atlantic "D" High Grade Guano.....	9.00	1.65	3.00
Atlantic "F" Cotton-seed Meal Comp. H. G..	9.00	1.65	3.00
Atlantic "B" High Grade Guano.....	8.00	3.29	4.00
Atlantic "C" High Grade Guano.....	8.00	2.47	3.00
Atlantic "E" Cotton-seed Meal Comp. H. G..	8.00	2.47	3.00
Atlantic "H" Standard Grade Guano.....	8.00	1.65	2.00
Atlantic "I" Standard Grade Guano.....	8.00	.82	4.00
Atlantic "L" Standard Grade Phosphate and Potash.....	8.00	....	4.00
Atlantic Nitrate of Soda.....	....	15.22	....
Atlantic Muriate of Potash.....	....	....	50.00
Atlantic Sulphate of Potash.....	....	....	49.00
Atlantic German Kainit.....	....	....	12.40
<i>Acme Manufacturing Co., Wilmington, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
Acme High Grade Acid Phosphate.....	14.00	....	....
Acme Acid Phosphate.....	13.00	....	....
Acme Bone and Potash.....	12.00	....	6.00
Acme Bone and Potash.....	12.00	....	5.00
Acme Bone and Potash.....	12.00	....	4.00
Acme Bone and Potash.....	12.00	....	3.00
Acme Bone and Potash.....	12.00	....	2.00
Acme Bone and Potash.....	11.00	....	6.00
Acme Bone and Potash.....	11.00	....	5.00
Acme Bone and Potash.....	11.00	....	4.00
Acme Bone and Potash.....	11.00	....	3.00
Acme Bone and Potash.....	11.00	....	2.00
Acme Bone and Potash.....	10.00	....	6.00
Acme Melon Grower.....	10.00	3.30	5.00
Acme Bone and Potash.....	10.00	....	5.00
Acme Bone and Potash.....	10.00	....	4.00
Acme Bone and Potash.....	10.00	....	3.00
Acme Bone and Potash.....	10.00	....	2.00
Acme Cotton Grower.....	9.00	2.27	2.00
Acme Special Fertilizer for Cotton.....	8.00	4.12	7.00
Acme Plumb Good Fertilizer.....	8.00	3.30	6.00
Acme "OK" Fertilizer.....	8.00	3.30	4.00
Quickstep Fertilizer.....	8.00	3.30	4.00
Quickstep Fertilizer for Tobacco.....	8.00	3.30	4.00
Acme Crop Grower.....	8.00	2.47	4.00
Currie's High Grade Fertilizer.....	8.00	2.47	4.00
Acme Crop Grower for Tobacco.....	8.00	2.47	4.00
Best's Fish Scrap Guano.....	8.00	2.47	3.00
Pee Dee Special Fertilizer.....	8.00	2.47	3.00
Pee Dee Special for Tobacco.....	8.00	2.47	3.00
Acme Plant Food.....	8.00	2.47	2.50
Acme Fertilizer for Tobacco.....	8.00	2.47	2.50
Acme Fertilizer.....	8.00	2.47	2.50
Tiptop Crop Grower.....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Tiptop Tobacco Grower.....	8.00	2.06	3.00
Lattimer's Complete Fertilizer.....	8.00	2.06	2.00
Best's Complete Fertilizer.....	8.00	2.06	2.00
Gem Fertilizer	8.00	1.65	2.00
Gem Fertilizer for Tobacco.....	8.00	1.65	2.00
Acme Special Grain Fertilizer.....	8.00	1.65	2.00
Acme Bone and Potash.....	8.00	....	6.00
Acme Bone and Potash.....	8.00	....	5.00
Acme Bone and Potash.....	8.00	....	4.00
Acme Root Crop Guano.....	7.00	4.12	7.00
Acme Standard Truck Guano.....	7.00	4.12	5.00
Acme High Grade Guano.....	6.00	4.95	8.00
Acme Truck Grower	6.00	3.30	8.00
Acme Corn Guano	6.00	2.47	3.00
Dried Fish Scrap.....	4.50	8.02	....
Acme Special 4-10-4 Guano.....	4.00	8.25	4.00
Clark's Corn Guano.....	1.00	6.58	10.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.83	....
Ground Dried Blood.....	....	12.91	....
Acme Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	48.00
Muriate of Potash.....	....	....	48.00
High Grade German Kainit.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Ashepoo Fertilizer Co., Charleston, S. C.—

High Grade Ashepoo Dissolved Phosphate...	16.00	....	....
High Grade Ashepoo Acid Phosphate.....	14.00	....	....
High Grade Ashepoo XXXX Acid Phosphate.....	14.00	....	....
High Grade Eutaw Acid Phosphate.....	14.00	....	....
Standard Ashepoo XXX Acid Phosphate.....	13.00	....	....
Standard Ashepoo Dissolved Bone.....	13.00	....	....
Standard Eutaw XXX Acid Phosphate.....	13.00	....	....
Standard Carolina Acid Phosphate.....	13.00	....	....
Standard Circle Bone	13.00	....	....
H. G. Ashepoo Bone and Potash.....	12.00	....	2.00
Standard Ashepoo Acid Phosphate and Potash	12.00	....	1.00
Standard Eutaw Acid Phosphate and Potash.	12.00	....	1.00
Standard Eutaw XX Acid Phosphate.....	12.00	....	....
Standard Coomassie Acid Phosphate.....	12.00	....	....
Standard Ashepoo XX Acid Phosphate.....	12.00	....	....
Standard Ashepoo Potash and Acid Phosphate	11.00	....	1.00
Standard Eutaw Potash Acid Phosphate.....	11.00	....	1.00
Standard Palmetto Potash Acid Phosphate...	11.00	....	1.00
High Grade Ashepoo Watermelon Guano.....	10.00	3.29	5.00
H. G. Ashepoo Cantaloupe Guano.....	10.00	2.46	10.00
Taylor's XX Ammoniated Dissolved Fertilizer	10.00	.82	1.00
H. G. Eutaw Superpotash Acid Phosphate...	10.00	....	4.00
High Grade Ashepoo Superpotash Acid Phos- phate	10.00	....	4.00
Standard Ashepoo Potash Compound.....	10.00	....	3.00
Standard Enoree Acid Phosphate and Potash.	10.00	....	2.00
Standard Ashepoo Wheat and Oats Specific..	9.50	1.65	1.00
Standard Ashepoo Fertilizer	9.00	1.85	1.00
Standard Eutaw Fertilizer	9.00	1.85	1.00
High Grade Taylor's Circle Guano.....	9.00	1.65	4.00
Standard Ashepoo Harrow Brand Raw Bone Superphosphate	9.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Eutaw XXX Guano.....	9.00	1.65	2.00
Standard Ashepoo Guano	8.50	2.06	1.00
Standard Eutaw XX Guano.....	8.50	1.65	2.00
Standard Ashepoo XX Guano.....	8.50	1.65	2.00
High Grade Ashepoo Fruit Grower.....	8.00	3.91	2.75
High Grade Ashepoo Perfection Guano.....	8.00	3.29	6.00
High Grade Ashepoo Guano.....	8.00	3.29	4.00
High Grade Ashepoo Ammoniated Superphosphate	8.00	2.46	4.00
High Grade Eutaw X Golden Fertilizer.....	8.00	2.46	4.00
High Grade Ashepoo Bird and Fish Guano...	8.00	2.46	3.00
High Grade Ashepoo Meal Mixture.....	8.00	2.46	3.00
High Grade Ashepoo X Tobacco Fertilizer...	8.00	2.46	3.00
High Grade Ashepoo Golden Tobacco Producer	8.00	2.46	3.00
High Grade Carolina XXX Guano.....	8.00	2.46	3.00
High Grade Eutaw Special Cotton-seed Meal Guano	8.00	2.46	2.00
High Grade Ashepoo Farmers' Special.....	8.00	2.06	3.00
Standard Eutaw Circle Guano.....	8.00	2.06	2.00
Standard Ashepoo Circle Guano.....	8.00	2.06	2.00
Standard Coomassie Circle Fertilizer.....	8.00	1.65	2.00
Standard Carolina Guano	8.00	1.65	2.00
Standard P. D. Fertilizer.....	8.00	1.65	2.00
Standard Ashepoo XXX Guano.....	8.00	1.65	2.00
Standard Ashepoo Special Fertilizer.....	8.00	1.65	2.00
Standard Brownwood Acid Phosphate.....	8.00	....	4.00
High Grade Ashepoo Truck Guano.....	7.00	4.12	5.00
High Grade Ashepoo Vegetable Guano.....	5.00	4.12	5.00
High Grade Ashepoo Nitrogenous Top Dressing	3.00	7.00	2.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	45.00
German Kainit .....	....	....	12.00

The Armour Fertilizer Works, Atlanta, Chicago and Wilmington—

Armour's Raw Bone Meal.....Total	22.00	3.70	....
17 Per Cent Acid Phosphate.....	17.00	....	....
16 Per Cent Acid Phosphate.....	16.00	....	....
Star Phosphate	14.00	....	....
13 Per Cent Acid Phosphate.....	13.00	....	....
12 Per Cent Acid Phosphate.....	12.00	....	....
Sampson Corn Mixture.....	11.00	....	5.00
Fertilizer, No. 1044.....	10.00	3.30	4.00
Fertilizer, No. 1025.....	10.00	1.65	5.00
Shield Fertilizer, No. 1023.....	10.00	1.65	3.00
Ammoniated Dissolved Bone and Potash.....	10.00	1.65	2.00
Phosphoric Acid and Potash.....	10.00	....	5.00
Superphosphate and Potash.....	10.00	....	4.00
M. H. White & Co.'s Special Corn Mixture...	10.00	....	2.00
Phosphate and Potash No. 1.....	10.00	....	2.00
African Cotton Grower.....	9.00	2.47	3.00
Bone and Dissolved Bone with Potash.....	9.00	1.65	3.00
Standard Cotton Grower.....	8.50	1.65	2.00
Bone, Blood and Potash.....	8.00	4.11	7.00
Van Lindley's Special.....	8.00	4.11	2.00
Fertilizer No. 846.....	8.00	3.30	6.00
Fertilizer No. 844.....	8.00	3.30	4.00
Special Trucker	8.00	3.30	4.00
All Soluble	8.00	2.88	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Truck and Berry Special.....	8.00	2.47	10.00
Underwood's Special.....	8.00	2.47	10.00
Fertilizer No. S36.....	8.00	2.47	6.00
Underwood's Favorite.....	8.00	2.47	3.00
Cotton Special.....	8.00	2.47	3.00
Tobacco Special.....	8.00	2.47	3.00
Truckers Special.....	8.00	2.47	3.00
Carolina Cotton Grower.....	8.00	2.47	2.00
Berry King.....	8.00	2.05	4.00
Gold Medal for Tobacco.....	8.00	2.05	3.00
Sweet Potato Special.....	8.00	2.05	3.00
Champion.....	8.00	2.05	2.50
King Cotton.....	8.00	2.05	2.00
High Grade Potato.....	8.00	1.65	10.00
Fruit and Root Crop Special.....	8.00	1.65	5.00
Carolina Cotton Special.....	8.00	1.65	3.00
Armour's Slaughter House Fertilizer.....	8.00	1.65	2.00
General.....	8.00	1.65	2.00
Fertilizer, No. S13.....	8.00	.82	3.00
Phosphate and Potash, No. 2.....	8.00	....	5.00
Phosphate and Potash, No. 3.....	8.00	....	4.00
7 Per Cent Trucker.....	6.00	5.76	5.00
5 Per Cent Trucker.....	6.00	4.11	7.00
Manure Substitute.....	6.00	3.30	4.00
10 Per Cent Trucker.....	5.00	8.24	3.00
Top Dresser.....	5.00	8.24	2.00
Special Formula for Tobacco.....	4.00	3.30	5.00
Harvey's Special.....	4.00	3.30	4.00
10 Per Cent Tankage.....	2.00	8.24	....
Nitrate of Soda.....	....	14.81	....
Dried Blood.....	....	13.16	....
Armour's Top Dresser.....	....	7.83	4.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Kainit.....	....	....	12.00

American Fertilizer Co., Norfolk, Va.—

Bone Meal.....Total	22.50	3.71	....
American High Grade Acid Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
Eagle Brand Acid Phosphate.....	13.00	....	....
Double Extra Bone and Potash.....	12.00	....	5.00
Acid Phosphate.....	12.00	....	....
American Standard Cotton Grower.....	10.00	1.65	2.00
American Formula for Wheat and Corn.....	10.00	....	5.00
Double Dissolved Bone and Potash.....	10.00	....	4.00
Dissolved Bone and Potash for Corn and Wheat.....	10.00	....	2.00
Strawberry and Asparagus Guano.....	9.00	2.88	9.00
Pitt County Special Fertilizer.....	9.00	2.88	5.00
Special Formula Guano for Yellow Leaf To- bacco.....	9.00	2.88	5.00
American Bone Mixture.....	9.00	.83	2.00
Blood and Bone Compound.....	8.50	2.06	1.00
Peruvian Mixture.....	8.50	1.65	1.50
Peruvian Mixture Guano Especially Prepared for Sweet Potatoes.....	8.00	3.29	5.00
N. C. and S. C. Cotton Grower.....	8.00	3.29	4.00
American Nonpareil Tobacco Grower.....	8.00	3.29	4.00
American Eagle Guano.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
J. G. Miller & Co.'s Yellow Leaf Fertilizer....	8.00	2.47	3.00
American No. 1 Fertilizer.....	8.00	2.06	3.00
Bob White Fertilizer for Tobacco.....	8.00	2.06	1.50
A. L. Hanna's Special.....	8.00	1.65	2.00
American No. 2 Fertilizer.....	8.00	1.65	2.00
American Special Potash Mixture for Wheat.	8.00	....	4.00
10 Per Cent Ammoniated Guano.....	7.00	8.24	2.50
American 7-7-7 for Irish Potatoes.....	7.00	5.76	7.00
Standard 7 Per Cent Ammonia Guano.....	7.00	5.76	5.00
Special Potato Guano.....	7.00	4.12	7.00
Kale, Spinach and Cabbage Guano.....	7.00	4.12	4.00
American Fish Scrap Guano.....	7.00	3.29	4.00
Stable Manure Substitute.....	7.00	2.47	4.00
Special Potato Manure.....	6.00	4.12	7.00
Nitrate of Soda.....	....	14.83	....
Ground Fish Scraps.....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*American Agricultural Chemical Co., Baltimore
and New York—*

Fine Ground Bone.....Total	22.88	2.47	....
Pure Ground Bone.....Total	20.59	3.70	....
Superphosphate	16.00	....	....
Canton Baker's Dissolved S. C. Phosphate....	14.00	....	....
Detrick's XXtra Acid Phosphate.....	14.00	....	....
Lazaretto Acid Phosphate.....	14.00	....	....
Zell's Dissolved Phosphate.....	14.00	....	....
Zell's Acid Phosphate.....	13.00	....	....
Canton Chemical Gem Phosphate.....	12.00	....	....
Southern Wheat Grower.....	12.00	....	6.00
Detrick's Victory Alkaline Bone.....	12.00	....	5.00
Lazaretto High Grade Dissolved Phosphate and Potash	12.00	....	5.00
Canton Soluble Alkaline Phosphate.....	12.00	....	3.00
Detrick's P. & B. Special Fertilizer.....	12.00	....	3.00
Lazaretto Alkaline Bone Phosphate.....	12.00	....	3.00
New Rival Crop Producer.....	10.00	.82	1.00
Zell's High Grade Potash Fertilizer.....	10.00	....	4.00
Royal Alkaline Bone.....	10.00	....	4.00
Canton Soluble Phosphate Potash.....	10.00	....	2.00
Detrick's Soluble Phosphate and Potash....	10.00	....	2.00
Lazaretto Dissolved Phosphate and Potash...	10.00	....	2.00
Zell's Electric Phosphate.....	10.00	....	2.00
Special Tobacco Fertilizer.....	9.00	2.47	3.00
Holmes & Dawson's Productive Cotton and Peanut Grower	9.00	2.47	2.00
Zell's Royal High Grade Fertilizer.....	9.00	2.06	2.00
Zell's Victoria Animal Bone Compound.....	9.00	1.85	4.00
Canton Chemical Animal Bone Fertilizer....	9.00	1.85	4.00
Detrick's Superior Animal Bone Fertilizer...	9.00	1.85	4.00
Lazaretto Retriever Animal Bone Fertilizer..	9.00	1.85	4.00
Holmes & Dawson's Gold Dust Guano.....	9.00	1.65	2.00
Lazaretto Peanut Grower	9.00	.82	3.00
Reese Pacific Guano for Tobacco.....	8.50	2.47	2.50
Lazaretto Manure Substitute.....	8.00	3.29	4.00
Lazaretto Carolina Cotton Food.....	8.00	3.29	4.00
Excelsior Compound for Tobacco.....	8.00	2.47	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Detrick's Quick Step Phosphate for Potatoes and Tobacco	8.00	2.47	4.00
Zell's Special Compound for Potatoes and Veg- etables	8.00	2.47	4.00
Zell's Tobacco Fertilizer.....	8.00	2.47	4.00
Zell's Bright Tobacco Grower.....	8.00	2.47	3.00
Zell's Reliance High Grade Manure.....	8.00	2.47	3.00
Canton Chemical Baker's Tobacco Fertilizer. Canton Chemical Superior High Grade Fertil- izer	8.00	2.47	3.00
Detrick's Special Tobacco Fertilizer.....	8.00	2.47	3.00
Lazaretto Challenge Fertilizer.....	8.00	2.47	3.00
Lazaretto Special Tobacco and Potato Fertil- izer	8.00	2.47	3.00
Canton Chemical CCC Special Compound.....	8.00	2.06	6.00
Canton Chemical Baker's Standard High Grade Guano	8.00	2.06	3.00
Detrick's Vegetator Ammoniated Superphos- phate	8.00	2.06	3.00
Lazaretto Climax Plant Food.....	8.00	2.06	3.00
Slingluff's British Mixture.....	8.00	2.06	2.50
Lazaretto Universal Compound.....	8.00	2.06	2.00
Canton Chemical Virginia Standard Manure..	8.00	2.06	2.00
Detrick's Kangaroo Komplete Kompond.....	8.00	1.65	3.00
Canton Chemical Baker's Fish Guano.....	8.00	1.65	2.00
Canton Chemical Game Guano.....	8.00	1.65	2.00
Detrick's Royal Crop Grower.....	8.00	1.65	2.00
Detrick's Fish Mixture.....	8.00	1.65	2.00
Holmes & Dawson's Dawson's Crop Maker...	8.00	1.65	2.00
Holmes & Dawson's Triumph Soluble.....	8.00	1.65	2.00
Lazaretto Crop Grower.....	8.00	1.65	2.00
Reese Pacific Guano.....	8.00	1.65	2.00
Zell's Special Compound for Tobacco.....	8.00	1.65	2.00
Zell's Calvert Guano.....	8.00	1.65	2.00
Zell's Ammoniated Superphosphate.....	8.00	1.65	2.00
Zell's Fish Guano.....	8.00	1.65	2.00
Savage, Son & Co. Purity Guano.....	8.00	1.65	2.00
Moro Phillip's Standard Guano.....	8.00	.82	4.00
Fidelity Crop Grower.....	8.00	.82	3.00
Enterprise Alkaline Bone.....	8.00	....	5.00
Palmetto Alkaline Phosphate.....	8.00	....	4.00
Canton Chemical Excelsior Trucker.....	7.00	4.11	5.00
Detrick's Special Trucker.....	7.00	4.11	5.00
Lazaretto Early Trucker.....	7.00	4.11	5.00
Zell's Truck Grower.....	7.00	4.11	5.00
Empire Trucker	7.00	3.29	4.00
Zell's 7 Per Cent Potato and Vegetable Manure	6.00	5.76	5.00
Canton Chemical Truckers' Special 7 Per Cent.	6.00	5.76	5.00
Detrick's Gold Basis.....	6.00	5.76	5.00
Lazaretto Truckers' Favorite.....	6.00	5.76	5.00
Bull Head Potato and Vegetable Manure.....	6.00	4.11	7.00
Detrick's Gold Eagle.....	6.00	2.47	6.00
Zell's 10 Per Cent Trucker.....	5.00	8.23	3.00
Nitrate of Soda.....	....	15.00	....
Special H. G. Dried Blood.....	....	13.16	....
Dry Ground Fish.....	....	8.23	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>A. D. Adair & McCarty Bros., Atlanta, Ga.—</i>			
Adair's High Grade Dissolved Bone, No. 16.	16.00	....	....
A. and M. 15-4.	15.00	....	4.00
Adair's High Grade Dissolved Bone.	14.00	....	....
A. and M. 13-4.	13.00	....	4.00
McCarty's Potash Formula, No. 5.	12.00	....	5.00
McCarty's Potash Formula, No. 4.	12.00	....	4.00
McCarty's Potash Formula.	12.00	....	2.00
Adair's Dissolved Bone.	12.00	....	....
David Harum Extra High Grade Blood Guano.	10.00	3.30	4.00
Adair's H. G. Blood and Bone.	10.00	2.47	3.00
Special Wheat Compound.	10.00	1.65	4.00
Special Corn Compound.	10.00	1.65	4.00
Special Vegetable Compound.	10.00	1.65	4.00
Special Potato Compound.	10.00	1.65	4.00
Special Cotton Compound.	10.00	1.65	4.00
Special Tomato Compound.	10.00	1.65	4.00
Adair's Soluble Pacific Guano.	10.00	1.65	2.00
McCarty's High Grade Cotton Grower.	10.00	1.65	2.00
McCarty's High Grade Corn Grower.	10.00	1.65	2.00
Old Time Fish Scrap Guano.	10.00	1.65	2.00
McCarty's Wheat Special.	10.00	.82	3.00
McCarty's Corn Special.	10.00	.82	3.00
McCarty's Cotton Special.	10.00	.82	3.00
Adair's Wheat and Corn Grower, No. 8.	10.00	....	8.00
H. G. Potash Compound, No. 8.	10.00	....	8.00
H. G. Potash Compound, No. 6.	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 6.	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 5.	10.00	....	5.00
H. G. Potash Compound, No. 5.	10.00	....	5.00
High Grade Potash Compound.	10.00	....	4.00
Adair's Wheat and Corn Grower.	10.00	....	4.00
Adair's Formula	10.00	....	2.00
Adair's Blood, Bone and Tankage Guano.	9.00	.82	2.00
Special Corn Grower.	8.00	1.65	6.00
Special Wheat Grower.	8.00	1.65	6.00
Special Potato Grower.	8.00	1.65	6.00
Special Vegetable Grower.	8.00	1.65	6.00
Standard Corn Grower.	8.00	1.65	2.00
Planters' Soluble Fertilizer.	8.00	1.65	2.00
Adair's Ammoniated Dissolved Bone.	8.00	1.65	2.00
Golden Grain Compound.	8.00	.82	3.00
Adair's Special Potash Mixture, No. 6.	8.00	....	6.00
Adair's Special Potash Mixture, No. 5.	8.00	....	5.00
Adair's Special Potash Mixture.	8.00	....	4.00
Nitrate of Soda.	....	15.00	....
Muriate of Potash.	....	....	50.00

Asheville Packing Co., Asheville, N. C.—

Asheville Packing Co.'s Pure Bone Meal.			
Total	18.00	2.00	....
Asheville Packing Co.'s H. G. Phosphoric Acid	16.00	....	....
Asheville Packing Co.'s Standard Phosphoric Acid	14.00	....	....
Asheville Packing Co.'s Extra H. G. Potash Mixture	13.00	....	4.00
Asheville Packing Co.'s Standard Phosphoric Acid	12.00	....	....
Asheville Packing Co.'s Celebrated Tankage.			
Total	10.00	4.12	....

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Asheville Packing Co.'s Extra H. G. Fertilizer	10.00	3.30	4.00
Asheville Packing Co.'s Blood and Bone.....	10.00	2.47	3.00
Asheville Packing Co.'s Extra H. G. Cotton Special	10.00	1.65	4.00
Asheville Packing Co.'s High Grade Biltmore Wheat Grower	10.00	1.65	3.00
Asheville Packing Co.'s H. G. Wheat, Corn and Oat Special.....	10.00	1.65	2.00
Asheville Packing Co.'s Standard Bone and Potash	10.00	.82	1.60
Asheville Packing Co.'s Superior Potato and Wheat Fertilizer	10.00	....	6.00
Asheville Packing Co.'s Special Potash Mix- ture	10.00	....	4.00
Asheville Packing Co.'s XXX Wheat Grower.	10.00	....	2.00
Asheville Packing Co.'s Standard Potato Fer- tilizer	9.00	.82	2.00
Asheville Packing Co.'s Extra H. G. Vegetable Special	8.00	4.12	5.00
Asheville Packing Co.'s Corn and Vegetable Special	8.00	2.47	3.00
Asheville Packing Co.'s Special Tobacco and Vegetable Fertilizer	8.00	2.47	3.00
Asheville Packing Co.'s Fruit Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Potato Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Champion Potato Fer- tilizer	8.00	1.65	4.00
Asheville Packing Co.'s Complete Fertilizer...	8.00	1.65	2.00
Asheville Packing Co.'s Standard Corn and Wheat	8.00	.82	3.00
Asheville Packing Co.'s Special Bone and Potash	8.00	....	4.00
Asheville Packing Co.'s H. G. Muriate of Pot- ash .....	....	....	50.00

Baugh & Sons Co., Phila., Pa., and Norfolk, Va.—

Baugh's Raw Bone Meal, Warranted Pure, Total	21.50	3.70
Baugh's 16 Per Cent Acid Phosphate.....	16.00	....	....
Baugh's Pure Bone and Muriate of Potash Mixture	15.00	2.47	5.00
Baugh's High Grade Acid Phosphate.....	14.00	....	....
Baugh's Pure Dissolved Animal Bones.....	13.00	2.06	....
Baugh's 12 and 5 Phosphate and Potash.....	12.00	....	5.00
Baugh's High Grade Cotton and Truck Guano	10.00	1.65	2.00
Baugh's High Grade Potash Mixture.....	10.00	....	4.00
Baugh's Soluble Alkaline Superphosphate....	10.00	....	2.00
Hassell's Tobacco Guano.....	9.00	2.26	2.00
Baugh's Fish, Bone and Potash.....	8.00	3.30	4.00
Baugh's Fruit and Berry Guano.....	8.00	2.47	10.00
Baugh's Special Tobacco Guano.....	8.00	2.47	5.00
Baugh's Grand Rapids High Grade Truck Guano	8.00	2.47	3.00
Baugh's Sweet Potato Guano for Sweet Pota- toes, Peas and Melons.....	8.00	2.47	3.00
Baugh's High Grade Tobacco Guano.....	8.00	2.47	3.00
Baugh's Complete Animal Base Fertilizer....	8.00	1.65	5.00
Baugh's Fish Mixture.....	8.00	1.65	2.00
Baugh's Animal Base and Potash Compound for All Crops.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Baugh's Wheat Fertilizer for Wheat and Grass	8.00	1.65	2.00
Baugh's Southern States Excelsior Guano....	8.00	1.00	3.00
Glover's Special Potato Guano.....	7.00	3.30	8.00
Baugh's Southern States Guano for Bright Tobacco	7.00	2.88	7.00
Baugh's Potato and Truck Special.....	7.00	2.88	7.00
Baugh's Strawberry Mixture.....	7.00	2.47	5.00
Baugh's Fine Ground Fish.....	6.87	8.23	....
Baugh's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
Baugh's Peruvian Guano Substitute for Pota- toes and All Vegetables.....	6.00	4.12	7.00
Baugh's 5-6-5 Guano	6.00	4.12	5.00
Baugh's New Process 10 Per Cent Guano....	5.00	8.23	2.50
Baugh's Special Potato Manure.....	5.00	1.65	10.00
Baugh's Wrapper Leaf Brand for Seed Leaf Tobacco	3.50	3.30	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.23	....
Baugh's Fine Ground Dried Blood.....	....	13.16	....
Fine Ground Blood .....	....	13.00	....
Baugh's Soluble Top Dresser for All Crops...	....	8.23	3.00
Baugh's Fine Ground Tankage.....	....	7.40	....
Muriate of Potash.....	....	....	48.00
High Grade Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>M. J. Best & Sons, Goldsboro, N. C.—</i>			
Pure German Kainit.....	....	....	12.00
<i>Paisley Boney, Goldsboro, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
<i>J. A. Benton, Ruffin, N. C.—</i>			
Benton's North Carolina Bright Fertilizer....	9.00	1.65	2.00
<i>Baltimore Fertilizer Co., Baltimore, Md.—</i>			
Honest Acid Phosphate.....	14.00	....	....
Honest Bone and Potash.....	10.00	....	2.00
Honest Sweet Potato Grower.....	8.00	2.40	4.00
Honest Cotton Grower	8.00	2.40	3.00
Honest Ammoniated Bone.....	8.00	1.60	2.00
Honest Revenue	7.00	2.40	6.00
Honest Success	7.00	.82	4.00
Honest Dixie Trucker.....	6.00	4.00	7.00
Honest Trucker	6.00	4.00	5.00
<i>Bertie Cotton Oil Co., Aulander, N. C.—</i>			
Bertie's High Grade Guano.....	8.00	4.13	5.00
Bertie's Meal Mixture.....	8.00	3.30	4.00
Bertie's Tobacco Grower.....	8.00	2.47	5.00
Bertie's Ideal Cotton Grower.....	8.00	2.47	3.00
Bertie's Special Compound.....	8.00	1.65	2.00
Bertie's Corn Mixture.....	7.00	2.47	2.00
Jumbo Peanut Grower.....	7.00	1.65	5.00
Bertie's Peanut Special.....	7.00	.82	4.00
Tar Heel Top Dresser.....	2.00	8.25	5.00
Nitrate of Soda.....	....	15.00	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Sulphate of Potash.....	52.00
Muriate of Potash.....	50.00
Kainit	12.00

Bowker Fertilizer Co., Baltimore, Md.—

Pure Ground Bone.....Total	20.59	3.70	....
Fine Ground Bone.....Total	22.88	2.47	....
16 Per Cent Dissolved Bone Phosphate.....	16.00	....	....
Bowker's Soluble Phosphate.....	14.00	....	....
Golden Harvest Fertilizer.....	12.00	....	5.00
Superphosphate with Potash for Grain and Grass	10.00	....	2.00
Sure Crop Phosphate.....	9.00	.82	2.00
Tobacco Fertilizer	8.00	2.47	3.00
Eureka Cotton Compound.....	8.00	2.47	3.00
Empire Standard	8.00	1.65	2.00
Corn and Grain Grower.....	8.00	.82	4.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Blackstone Guano Co., Inc., Blackstone, Va.—

Blackstone Raw Bone.....Total	20.00	3.70
Clover Leaf 16 Per Cent Phosphate.....	16.00	....	....
B. G. Co., Acid Phosphate.....	14.00	....	....
Clover Leaf Grain Fertilizer.....	13.00	1.03	1.00
Dissolved Bone	10.00	1.03	1.00
B. G. Co., Inc., Bone and Potash.....	10.00	....	4.00
B. G. Co., Bone and Potash.....	10.00	....	2.00
Blackstone Special for Tobacco.....	9.00	2.47	3.00
Old Bellefonte	8.00	3.30	2.00
Clover Leaf Brand for Tobacco.....	8.00	2.47	3.00
Tobacco Special	8.00	2.47	3.00
Wrapper Brand	8.00	2.47	3.00
Jim Crow for Tobacco.....	8.00	2.47	3.00
Bellefonte	8.00	2.47	2.00
Hard Cash for Tobacco.....	8.00	2.06	2.00
Carolina Special for Tobacco.....	8.00	1.65	4.00
Standard Guano	8.00	1.65	2.00
Red Letter for Tobacco.....	8.00	1.65	2.00
Alliance for Tobacco.....	8.00	1.65	2.00
Leader for Tobacco.....	8.00	1.65	2.00

John L. Bailey Co., Elm City, N. C.—

Fairmont Guano	8.00	2.47	3.00
Stag Brand Fertilizer.....	8.00	1.65	2.00

C. J. Burton Guano Co., Baltimore, Md.—

Acid Phosphate	14.00	....	....
Burton's Alkaline	10.00	....	4.00
Burton's Potash Mixture.....	10.00	....	2.00
High Grade Tobacco.....	8.00	3.29	4.00
Burton's Best	8.00	2.47	3.00
Tobacco Queen	8.00	2.47	3.00
Burton's High Grade.....	8.00	2.06	3.00
Burton's Butcher Bone.....	8.00	1.65	2.00

Bradley Fertilizer Co., Charleston, S. C.—

High Grade Bradley's Dissolved Phosphate...	16.00	....	....
High Grade Bradley's Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Bradley's XXX Acid Phosphate....	13.00	....	....
Standard Bradley's Acid Phosphate.....	12.00	....	....
Standard Bradley's Palmetto Acid Phosphate.	12.00	....	....
H. G. Bradley's Selected Guano.....	10.00	1.65	4.00
High Grade Bradley's Potash Acid Phosphate.	10.00	....	4.00
Standard Bradley's Wheat Grower.....	10.00	....	2.00
Standard Bradley's Bone and Potash.....	10.00	....	2.00
Standard Bradley's Ammoniated Dissolved Bone	9.00	1.85	1.00
Standard Bradley's Patent Superphosphate...	9.00	1.85	1.00
Standard B. D. Sea Fowl Guano.....	9.00	1.85	1.00
Standard Eagle Ammoniated Bone Superphos- phate	9.00	1.85	1.00
High Grade Bradley's Circle Guano.....	8.00	3.29	4.00
High Grade Bradley's Guano.....	8.00	2.46	3.00
Standard Bradley's Cereal Guano.....	8.00	1.65	2.00
Standard Bradley's X Guano.....	8.00	1.65	2.00
German Kainit .....	....	....	12.00

Baltimore Pulverizing Co., Baltimore, Md.—

Royal Guano	8.00	1.65	2.00
5 Per Cent Potato Guano.....	7.00	4.11	5.00
Special 7 Per Cent Potato Guano.....	6.00	5.75	5.00

The Bryant Fertilizer Co., Alexandria, Va.—

Bryant's Bone Meal.....Total	22.50	2.47	....
Bryant's Acid Phosphate.....	17.00	....	....
Bryant's Acid Phosphate.....	16.00	....	....
Bryant's S. C. Dissolved Bone.....	14.00	....	....
Bryant's H. G. Wheat Mixture.....	12.00	....	6.00
Bryant's Bone and Potash.....	10.00	....	4.00
Bryant's Bone and Potash Mixture.....	10.00	....	2.00
Bryant's "Challenge" Highest Grade Tobacco Mixture	9.00	2.46	3.00
Bryant's Special Cotton-seed Meal Fertilizer.	9.00	2.26	2.00
Bryant's Bone Mixture for Tobacco.....	9.00	2.06	2.00
Bryant's H. G. Guano.....	8.00	3.29	4.00
Bryant's H. G. Fertilizer.....	8.00	2.47	3.00
Bryant's "Victor" Tobacco Fertilizer.....	8.00	2.47	3.00
Bryant's Choice, C. S. M. 3 Per Cent Mixture.	8.00	2.47	2.00
Bryant's "Otter" Special Tobacco Fertilizer..	8.00	2.06	3.00
Bryant's Cotton and Corn Fertilizer.....	8.00	2.06	2.00
Bryant's Special Fertilizer for Tobacco.....	8.00	2.06	2.00
Bryant's Cotton Grower.....	8.00	1.65	2.00
Bryant's Special Fertilizer.....	8.00	1.65	2.00
Bryant's Cotton-seed Meal Guano.....	8.00	1.65	2.00
Bryant's "Potomac" Bone Special for Tobacco.	8.00	1.65	2.00
Bryant's Special Formula for Grain and Grass	8.00	1.00	4.00
Bryant's Wheat Mixture.....	8.00	....	4.00
Bryant's Truck Grower.....	7.00	5.77	7.00
Bryant's Fish Scrap Guano.....	7.00	3.29	4.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Bryant's German Kainit.....	....	....	12.00

The Berkley Chemical Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Resolute Acid Phosphate.....	16.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Berkley Acid Phosphate.....	14.00	....	....
Berkley Bone and Potash Mixture.....	11.00	....	2.00
Berkley Plant Food.....	10.00	....	4.00
Laurel Potash Mixture.....	10.00	....	2.00
Monitor Animal Bone Fertilizer.....	9.00	1.85	4.00
Select Crop Grower.....	8.50	2.06	2.50
Victory Special Crop Grower.....	8.00	3.29	4.00
Berkley Tobacco Guano.....	8.00	2.47	3.00
Advance Crop Grower.....	8.00	2.47	3.00
Brandon Superphosphate.....	8.00	1.65	2.00
Long Leaf Tobacco Grower.....	8.00	1.65	2.00
Berkley Peanut and Grain Grower.....	8.00	1.00	4.00
Superior Bone and Potash.....	8.00	....	4.00
Mascot Truck Guano.....	7.00	4.11	5.00
Royal Truck Grower.....	6.00	5.76	5.00
The Leader of the World.....	5.00	3.29	5.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Bragaw Fertilizer Co., Washington, N. C.—

Palmetto Acid Phosphate.....	14.00	....	....
Long Acre Bone Phosphate.....	14.00	....	....
Farmers' Union Meal Mixture.....	9.00	2.26	2.00
Beaufort County Guano.....	8.00	2.47	3.00
Havana Tobacco Guano.....	8.00	2.47	3.00
Tuckahoe Tobacco Guano.....	8.00	2.06	3.00
Old Reliable Premium Guano.....	8.00	1.65	2.00
Tar Heel Guano.....	8.00	1.65	2.00
Pamlico Trucker.....	7.00	4.12	8.00
Riverview Potato Grower.....	6.00	5.76	5.00
Chocowinity Special Tobacco Guano.....	5.00	3.29	6.00
Sunrise Tobacco Guano.....	4.00	2.47	5.00
Genuine German Kainit.....	....	....	12.00

Conestee Chemical Co., Wilmington, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Conestee High Grade Acid Phosphate.....	14.00	....	....
Conestee Acid Phosphate.....	13.00	....	....
Conestee Bone and Potash.....	11.00	....	6.00
Conestee Bone and Potash.....	11.00	....	5.00
Conestee Bone and Potash.....	11.00	....	4.00
Conestee Bone and Potash.....	11.00	....	3.00
Conestee Bone and Potash.....	11.00	....	2.00
Conestee Bone and Potash.....	10.00	....	6.00
Conestee Bone and Potash.....	10.00	....	5.00
Conestee Bone and Potash.....	10.00	....	4.00
Conestee Bone and Potash.....	10.00	....	3.00
Conestee Bone and Potash.....	10.00	....	2.00
Conestee Cotton Grower.....	9.00	2.27	2.00
Conestee Melon Grower.....	8.00	4.11	7.00
Conestee P. D. Q. Fertilizer.....	8.00	3.30	4.00
Conestee "O. K." Fertilizer.....	8.00	3.30	4.00
Conestee P. D. Q. Fertilizer for Tobacco.....	8.00	3.30	4.00
Conestee Plumb Good Fertilizer.....	8.00	2.47	4.00
Conestee Crop Grower for Tobacco.....	8.00	2.47	4.00
Conestee Fish Scrap Guano.....	8.00	2.47	3.00
Conestee Special Fertilizer.....	8.00	2.47	3.00
Conestee Special Tobacco Fertilizer.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Conestee Fertilizer for Tobacco.....	8.00	2.47	2.50
Conestee Fertilizer	8.00	2.47	2.50
Conestee Crop Grower.....	8.00	2.06	3.00
Conestee Tobacco Grower.....	8.00	2.06	3.00
Conestee Complete Fertilizer.....	8.00	2.06	2.00
Conestee Special Grain Fertilizer.....	8.00	1.65	2.00
Conestee Standard Guano for Tobacco.....	8.00	1.65	2.00
Conestee Standard Guano.....	8.00	1.65	2.00
Conestee Bone and Potash.....	8.00	....	6.00
Conestee Bone and Potash.....	8.00	....	5.00
Conestee Bone and Potash.....	8.00	....	4.00
Conestee Root Crop Guano.....	7.00	4.11	7.00
Conestee High Grade Guano.....	6.00	4.95	8.00
Conestee Truck Grower.....	6.00	3.30	8.00
Conestee Corn Guano.....	6.00	2.47	3.00
Dried Fish Scrap.....	4.50	8.02	....
Conestee Special Top Dresser.....	4.00	8.25	4.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.83	....
Ground Dried Blood .....	....	12.91	....
Conestee Top Dresser.....	....	7.41	3.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
H. G. German Kainit 16 Per Cent.....	....	....	16.00
Genuine German Kainit .....	....	....	12.00

E. W. Brouley, Mooresville, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Red	10.00	2.47	3.00
Leo	8.00	2.47	3.00
16 Per Cent Dried Blood.....	....	13.17	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit .....	....	....	12.00

Columbia Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Raw Bone Meal.....Total	20.25	3.71	....
Columbia High Grade 16 Per Cent Acid Phosphate	16.00	....	....
Columbia 14 Per Cent Acid Phosphate.....	14.00	....	....
Columbia Dissolved Bone.....	13.00	....	....
Columbia Acid Phosphate.....	12.00	....	....
Columbia 11 and 5 Bone and Potash Mixture.....	11.00	....	5.00
Columbia 10 and 5 Bone and Potash Mixture.....	10.00	....	5.00
Columbia 10 and 4 Bone and Potash Mixture.....	10.00	....	4.00
Columbia Bone and Potash for Grain.....	10.00	....	3.00
Columbia Bone and Potash Mixture.....	10.00	....	2.00
McRae's Special	9.00	4.12	7.00
Columbia C. S. M. Special.....	9.00	2.27	2.00
Roanoke Ammoniated Guano.....	9.00	1.65	3.00
Carolina Soluble Guano.....	9.00	1.65	1.00
McRae's High Grade Guano.....	8.00	3.30	7.00
Pelican Ammoniated Guano.....	8.00	3.30	4.00
Columbia Special Truck Guano.....	8.00	3.30	4.00
Trojan Tobacco Guano.....	8.00	3.30	4.00
Columbia Special 4-8-3.....	8.00	3.30	3.00
Hayes' Special	8.00	3.30	3.00
Olympia Cotton Guano.....	8.00	2.47	3.00
Hyco Tobacco Guano.....	8.00	2.47	3.00
Our Best Meal Guano.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Royal Tobacco Fertilizer.....	8.00	2.06	3.00
Columbia Special Tobacco Guano.....	8.00	2.06	2.00
Columbia Soluble for Tobacco.....	8.00	1.65	2.00
Columbia Special Wheat Fertilizer.....	8.00	1.65	2.00
Columbia Soluble Guano.....	8.00	1.65	2.00
Spinola Peanut Grower.....	8.00	1.02	4.00
Columbia 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Columbia Special 7 Per Cent Truck Guano...	7.00	5.77	7.00
Columbia Potato Guano.....	7.00	4.12	5.00
Crown Brand Peanut Guano.....	7.00	....	5.00
Crew's Special	5.85	4.49	10.00
Columbia Side Dresser.....	4.00	8.22	4.00
Columbia Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Columbia Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Gemine German Kainit.....	....	....	12.00

*Cumberland Bone and Phosphate Co., Portland,
Me., and Charleston, S. C.—*

Standard Cumberland Bone and Superphosphate of Lime.....	9.00	1.85	1.00
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The Coc-Mortimer Co., Charleston, S. C.—

Thomas Phosphate (Basic Slag).....	19.00
Thomas Phosphate (Basic Slag).....	17.50
Thomas Phosphate (Basic Slag).....	17.00	....	....
Imported Ground Fish Guano, No. 2.....	6.80	9.46	....
Imported Ground Fish Guano, No. 1.....	6.80	8.23	....
High Grade Tankage.....	6.80	8.22	....
High Grade Tankage.....	6.80	7.45	....
Imported Fish Guano.....Total	6.20	5.60	....
High Grade Tankage.....	5.00	8.23	....
High Grade Tankage.....Total	5.00	7.61	....
Imported Fish Guano.....Total	4.48	5.77	....
Imported Fish Guano.....Total	2.00	9.87	....
Nitrate of Soda.....	....	14.76	....
Dried Blood, No. 2.....	....	13.37	....
Nitrate of Potash.....	....	12.30	44.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Cooper Guano Co., Wilmington, N. C.—

Cooper's 16 Per Cent Acid Phosphate.....	16.00	....	....
Cooper's 14 Per Cent Acid Phosphate.....	14.00	....	....
Cooper's Grain Producer.....	10.00	....	4.00
Cooper's Grain Grower.....	10.00	....	2.00
Cooper's Recorder	8.85	1.65	2.00
Cooper's Kite	8.00	4.11	7.00
Cooper's Helmet	8.00	3.29	4.00
Cooper's Horta	8.00	3.29	4.00
Cooper's Chadbourn Trucker.....	8.00	2.47	10.00
Cooper's Henox	8.00	2.47	3.00
Cooper's Sunset C. S. M.....	8.00	2.47	3.00
Cooper's Clifford	8.00	2.47	3.00
Cooper's Swamp Fox.....	8.00	2.47	2.50
Cooper's Bunker Hill.....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Cooper's Crusoe	8.00	2.06	2.00
Cooper's Potato	8.00	1.65	10.00
Cooper's Reward	8.00	1.65	2.00
Cooper's Waccamaw	8.00	1.65	2.00
Cooper's Genuine Eagle Island.....	8.00	1.65	2.00
Cooper's Sterling Complete.....	8.00	1.65	2.00
Cooper's Peanut Bouncer.....	8.00	.83	4.00
Cooper's Finis	7.00	4.11	5.00
Nitrate of Soda.....	....	14.82	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00

Craven Chemical Co., New Bern, N. C.—

Panama 16 Per Cent Acid Phosphate.....	16.00	....	....
Jewel Acid Phosphate.....	14.00	....	....
Trent Bone and Potash.....	10.00	....	2.00
Halifax Guano	9.00	2.47	3.00
Prolix 9-2-3 Special Guano.....	9.00	1.65	3.00
Hanover Standard Guano.....	8.00	3.29	4.00
Duplin Tobacco Guano.....	8.00	2.47	3.00
Gaston High Grade Fertilizer.....	8.00	2.47	3.00
C. E. Foy High Grade Guano.....	8.00	2.47	3.00
Marvel Great Crop Grower.....	8.00	2.06	3.00
Elite Cotton Guano	8.00	1.65	2.00
Pantego Potato Guano.....	7.00	4.12	7.00
Neuse Truck Grower.....	6.00	4.94	6.00
Craven Chemical Co.'s Truck Guano, 5-10-21 ₂ ..	5.00	8.24	2.50
Genuine German Kainit.....	....	....	12.00

William H. Camp, Petersburg, Va.—

Bone Meal.....Total	22.50	3.80	....
Camp's Acid Phosphate.....	16.00	....	....
Camp's Acid Phosphate.....	14.00	....	....
Camp's Shepherd Brand Bone and Potash....	10.00	....	4.00
Camp's Bone and Potash.....	10.00	....	2.00
Camp's Yellow Head Chemicals.....	8.00	2.87	7.50
Camp's Lion and Monkey for Tobacco.....	8.00	2.46	3.00
Camp's Red Head Chemicals.....	8.00	2.25	2.00
Camp's Lion and Monkey.....	8.00	1.65	2.00
Camp's Green Head Chemicals, Irish Potato..	7.00	6.15	10.00
Camp's Above All.....	6.00	5.75	5.00
Nitrate of Soda.....	....	14.75	....
German Kainit .....	....	....	12.00

Clayton Oil Mill, Clayton, N. C.—

C. O. M. 16 Per Cent Acid Phosphate.....	16.00	....	....
C. O. M. 14 Per Cent Acid Phosphate.....	14.00	....	....
C. O. M. High Grade Bone and Potash.....	12.00	....	5.00
C. O. M. Wheat Compound.....	10.00	2.05	4.50
C. O. M. Special Corn Mixture.....	10.00	....	5.00
C. O. M. Bone and Potash.....	10.00	....	4.00
C. W. H. Special.....	8.00	4.10	5.00
Clayton Guano	8.00	2.47	3.00
Clayton Special Tobacco Grower.....	8.00	2.47	3.00
Planters' Favorite	8.00	2.47	3.00
Cotton Queen	8.00	1.65	2.00
Summer Queen	8.00	1.65	2.00
C. O. M. Top Dresser.....	2.00	6.56	1.50
Perfection Top Dresser.....	....	9.85	4.00
C. O. M. German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Chesapeake Chemical Co., Baltimore, Md.—</i>			
C. C. C.'s Rapid Trucker.....	8.00	3.28	7.00
C. C. C.'s Pure German Kainit.....	....	....	12.40
<i>Cowell, Swan & McCotter Co., Bayboro, N. C.—</i>			
Bone Phosphate	11.00	....	....
Standard Cotton Grower.....	8.00	3.30	3.00
Champion Guano	8.00	2.47	3.00
Cowell's Great Tobacco Grower.....	8.00	2.47	3.00
Quick Grower Guano.....	8.00	2.06	3.00
Rust Proof Cotton Guano.....	8.00	1.65	3.00
Crop Guano	8.00	1.65	2.00
Great Cabbage and Potato Guano.....	7.00	5.77	7.00
Oriental Trucker	7.00	4.12	8.00
Aurora Trucker	7.00	4.12	7.00
High Grade Truck Guano.....	7.00	4.12	5.00
Potato Favorite Guano.....	7.00	3.30	7.00
Cabbage Guano	5.00	8.25	2.50
German Kainit .....	....	....	12.00
<i>Congaree Fertilizer Co., Columbia, S. C.—</i>			
Congaree H. G. Acid Phosphate (3).....	16.00	....	....
Congaree H. G. Acid Phosphate.....	14.00	....	....
Congaree H. G. Acid Phosphate.....	13.00	....	....
Congaree Superphosphate and Potash.....	11.00	....	1.00
Congaree Superphosphate and Potash.....	10.00	....	4.00
Congaree Superphosphate and Potash.....	10.00	....	3.00
Congaree Superphosphate and Potash.....	10.00	....	2.00
Congaree Ammoniated Bone Superphosphate.	9.00	2.26	2.00
Congaree Prize Winner.....	9.00	1.65	2.00
Congaree Double Ammoniated.....	8.00	6.78	4.00
Congaree Early Trucker.....	8.00	3.30	8.00
Congaree Early Boll.....	8.00	3.30	6.00
Congaree H. G. Fish Guano.....	8.00	3.30	4.00
Congaree Debt Payer.....	8.00	3.30	4.00
Congaree Tobacco Grower.....	8.00	3.30	4.00
Congaree H. G. Fish Guano.....	8.00	2.47	3.00
Congaree Soil Builder.....	8.00	2.47	3.00
Congaree Special Meal Mixture.....	8.00	2.47	3.00
Congaree Tobacco Grower.....	8.00	2.47	3.00
Congaree H. G. Corn Guano.....	8.00	2.47	2.00
Congaree Farmers' Choice.....	8.00	2.06	2.00
North Carolina Standard.....	8.00	1.64	2.00
Congaree Superphosphate and Potash.....	8.00	....	4.00
Truck Farmers' Choice.....	7.00	4.13	7.00
Congaree Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	14.79	....
Congaree Ash Element.....	....	8.23	6.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
<i>Chickamauga Fertilizer Works, Atlanta, Ga.—</i>			
Chickamauga High Grade Dissolved Bone, No. 16.....	16.00	....	....
Chickamauga High Grade Dissolved Bone....	14.00	....	....
Chickamauga 13-4.....	13.00	....	4.00
Chickamauga Potash Special, No. 4.....	12.00	....	4.00
Chickamauga Potash Special.....	12.00	....	2.00
Chickamauga Dissolved Bone.....	12.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Chickamauga Very Best.....	10.00	3.30	4.00
Ben Hur H. G. Guano.....	10.00	2.47	3.00
Special Potato Compound.....	10.00	1.65	4.00
Special Wheat Compound.....	10.00	1.65	4.00
Special Vegetable Compound.....	10.00	1.65	4.00
Special Corn Compound.....	10.00	1.65	4.00
Chickamauga High Grade Fertilizer.....	10.00	1.65	2.00
Chickamauga High Grade Plant Food.....	10.00	1.65	2.00
Chickamauga Fish Scrap Guano.....	10.00	1.65	2.00
Chickamauga Wheat Special.....	10.00	.82	3.00
Chickamauga Corn Special.....	10.00	.82	3.00
Chickamauga Cotton Special.....	10.00	.82	3.00
Old Glory Mixture.....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower, No. 8.	10.00	....	8.00
Chickamauga Wheat and Corn Grower, No. 6.	10.00	....	6.00
Chickamauga Wheat and Corn Grower, No. 5.	10.00	....	5.00
Chickamauga Wheat and Corn Grower.....	10.00	....	4.00
Chickamauga Bone and Potash.....	10.00	....	2.00
Chickamauga Blood, Bone and Tankage Guano	9.00	.82	2.00
Special Potato Grower.....	8.00	1.65	6.00
Special Wheat Grower.....	8.00	1.65	6.00
Special Vegetable Grower.....	8.00	1.65	6.00
Special Corn Grower.....	8.00	1.65	6.00
Chickamauga Complete Fertilizer.....	8.00	1.65	2.00
Chickamauga Standard Corn Grower.....	8.00	1.65	2.00
Chickamauga Standard Wheat Grower.....	8.00	1.65	2.00
Georgia Home Guano.....	8.00	1.65	2.00
No. 3 Bone, Tankage and Potash Mixture....	8.00	.82	3.00
Chickamauga Alkaline Bone, No. 6.....	8.00	....	6.00
Chickamauga Alkaline Bone, No. 5.....	8.00	....	5.00
Chickamauga Alkaline Bone.....	8.00	....	4.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	50.00

Canton Fertilizer Co., Canton, Ga.—

High Grade Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
R. T. Jones Extra H. G.....	10.00	2.47	3.00
Elberta	10.00	2.06	7.00
North Georgia High Grade.....	10.00	2.06	3.00
Southern King High Grade.....	10.00	1.65	2.00
Fish Ammoniated High Grade.....	10.00	1.65	2.00
Orange High Grade.....	10.00	1.65	2.00
Jomeo High Grade.....	10.00	1.65	2.00
Quickstep Wheat and Grain Grower.....	10.00	.82	3.00
Special Potash Mixture.....	10.00	....	4.00
Fish Ammoniated Standard.....	8.00	1.65	2.00
Jomeo Standard Grade.....	8.00	1.65	2.00
Southern King Standard Grade.....	8.00	1.65	2.00
Dissolved Bone and Potash.....	8.00	....	4.00

The Chesapeake Chemical Co., Baltimore, Md.—

C. C. Co.'s Reliable Phosphate.....	10.00	....	4.00
C. C. Co.'s Celebrated Mixture.....	10.00	....	2.00
C. C. Co.'s Dissolved Phosphate.....	14.00	....	....
C. C. Co.'s High Grade Guano.....	8.00	3.28	4.00
C. C. Co.'s Excelsior Fertilizer.....	8.00	2.46	4.00
C. C. Co.'s Fish Guano.....	8.00	2.46	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
C. C. Co.'s Ammoniated Phosphate.....	8.00	1.64	3.00
C. C. Co.'s National Crop Grower.....	8.00	1.64	2.00
C. C. Co.'s Keystone Phosphate.....	7.00	3.28	5.00
C. C. Co.'s Potato Compound.....	6.00	4.10	5.00
C. C. Co.'s Prolific Top Dresser.....	....	7.51	3.50

*Caraleigh Phosphate and Fertilizer Works,
Raleigh, N. C.—*

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....	16.00	....	....
Climax Dissolved Bone.....	14.00	....	....
Sterling Acid Phosphate.....	13.00	....	....
Stable Acid Phosphate.....	12.00	....	....
Horne & Son's High Grade Bone and Potash.	11.00	....	5.00
Special Bone and Potash Mixture.....	10.00	....	4.00
Morris & Scarboro's Special Bone and Potash.	10.00	....	3.00
Electric Bone and Potash Mixture.....	10.00	....	2.00
Pacific Tobacco and Cotton Grower.....	9.00	2.26	2.00
Rhankatte Special Tobacco Guano.....	8.00	3.30	6.00
Special 8-4-4	8.00	3.30	4.00
Horne's Best	8.00	2.47	3.00
Eclipse Ammoniated Guano.....	8.00	2.47	3.00
Planters' Pride	8.00	2.06	3.00
Caraleigh Special Tobacco Guano.....	8.00	2.06	3.00
Eli Ammoniated Fertilizer.....	8.00	1.65	2.00
Crown Ammoniated Guano.....	8.00	1.65	2.00
Comet Guano	8.00	.82	3.00
Buncombe Wheat Grower.....	8.00	....	4.00
Caraleigh Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Crown Fertilizer Co., Baltimore, Md.—

Crown 4-8-4	8.00	3.29	4.00
Crown 3-8-3	8.00	2.47	3.00
Crown 2-8-2	8.00	1.65	2.00
Crown Top Dressing.....	....	7.41	3.00

W. B. Cooper, Wilmington, N. C.—

Nitrate of Soda.....	....	14.82	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00

Contentnea Guano Co., Wilson, N. C.—

High Grade 16 Per Cent Acid.....	16.00	....	....
Contentnea 14 Per Cent Acid.....	14.00	....	....
Special Formula Fertilizer.....	12.00	1.65	4.00
Special Formula	10.00	4.10	6.00
Bone and Potash Mixture.....	10.00	....	5.00
Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Howard and Williams Cotton Special.....	9.00	3.30	6.00
Carr's Special for Cotton.....	9.00	2.47	2.75
Contentnea Cotton Formula.....	9.00	2.25	2.00
16 Per Cent German Kainit.....	....	....	16.00
8-4½-7 for Tobacco.....	8.00	3.70	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
S-41½-7 for Cotton.....	8.00	3.70	7.00
Whitehead Farm Cotton Grower.....	8.00	3.30	5.00
Climax High Grade.....	8.00	3.29	4.00
High Grade Tobacco Grower.....	8.00	2.88	5.00
Carr's Special for Tobacco.....	8.00	2.67	6.00
Government Formula, No. 1.....	8.00	2.47	10.00
Government Formula, No. 2.....	8.00	2.47	8.00
Victor Fertilizer for Tobacco.....	8.00	2.47	5.00
Tobacco Growers Special Formula.....	8.00	2.47	4.00
Pick Leaf Tobacco Fertilizer.....	8.00	2.47	3.00
Top Notch	8.00	2.47	3.00
Contentnea Cotton Grower.....	8.00	2.47	2.50
Contentnea Tobacco Special.....	8.00	2.05	3.00
Blood and Bone Cotton Compound.....	8.00	1.65	2.00
Contentnea Corn Special.....	5.00	1.65	5.00
Contentnea Top Dresser.....	3.00	8.23	5.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00
<i>J. W. Carter, Marton, N. C.—</i>			
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>Cooper Guano Co., Wilmington, N. C.—</i>			
Cooper's Bald Head Island.....	8.00	1.65	2.00
<i>C. P. Dey, Beaufort, N. C.—</i>			
Ground Fish Scrap.....	6.00	9.37	....
<i>Dixie Guano Co., Savannah, Ga.—</i>			
Phosphoric Acid.....	16.00	....	....
Phosphoric Acid.....	14.00	....	....
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00

Dixie Guano Co., Durham, N. C.—

Dixie 16 Per Cent Acid Phosphate.....	16.00
Dixie 14 Per Cent Acid Phosphate.....	14.00	....	....
Dixie Champion for Wheat and Corn.....	10.50	....	1.50
Jeff Davis Special.....	9.00	2.26	2.00
Dixie Star Ammoniated.....	9.00	1.65	1.00
Dixie Corn Fertilizer.....	9.00	.82	3.00
Radium Brand Guano.....	8.00	3.28	5.00
Dixie Tobacco Fertilizer.....	8.00	2.46	3.00
Carolina Special Ammoniated.....	8.00	2.46	3.00
Sulky Plow Brand Guano.....	8.00	2.46	2.00
Battle's Blood and Bone Fertilizer.....	8.00	2.05	3.00
Niagara Soluble Bone.....	8.00	2.05	2.00
Dixie Cotton Fertilizer.....	8.00	1.65	2.00
Old Plantation Superphosphate.....	8.00	1.65	2.00

Etiwan Fertilizer Co., Charleston, S. C.—

Etiwan 16 Per Cent Acid Phosphate.....	16.00	....	....
Etiwan High Grade Acid Phosphate.....	14.00	....	....
Etiwan Dissolved Bone.....	13.00	....	....
Diamond Soluble Bone.....	13.00	....	....
Etiwan Acid Phosphate with Potash.....	11.00	....	1.00
Plow Brand Acid Phosphate with Potash....	11.00	....	1.00
Etiwan Potash Bone.....	10.00	....	4.00
Etiwan Soluble Bone with Potash.....	10.00	....	3.00
Diamond Soluble Bone with Potash.....	10.00	....	2.00
XX Acid Phosphate with Potash.....	10.00	....	2.00
Etiwan Blood and Bone Guano.....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate.....	9.00	2.06	1.00
Etiwan 9-2-3 Per Cent Ammoniated Fertilizer.	9.00	1.65	3.00
Plow Brand Ammoniated Dissolved Bone....	8.85	1.65	2.00
Etiwan Superior Cotton Fertilizer.....	8.00	3.30	6.00
Etiwan Special Cotton Fertilizer.....	8.00	3.30	4.00
Plow Brand Special Tobacco Fertilizer.....	8.00	3.30	4.00
Etiwan Cotton Compound.....	8.00	2.47	3.00
Etiwan High Grade Cotton Fertilizer.....	8.00	2.47	2.00
Etiwan Ammoniated Fertilizer.....	8.00	1.65	2.00
Plow Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Etiwan Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Elmore Gin and Fertilizer Co., Elmore Siding, N. C.—</i>			
Elmore Cantaloupe Special.....	8.00	4.00	7.00
Elmore Standard Cotton Fertilizer.....	8.00	3.00	3.00
Elmore X Fertilizer.....	8.00	2.60	2.70

Eastern Cotton Oil Co., Hertford, N. C.—

Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
Currituck Special for Yellow Sweets.....	8.00	3.29	6.00
Mat White Special.....	8.00	3.29	4.00
Hgrows Currituck Yellows.....	8.00	2.47	3.00
Rain-proof Cotton Grower.....	8.00	2.47	3.00
Fish and Blood Mixture.....	8.00	1.65	2.00
Perquinans Favorite.....	8.00	1.65	2.00
Early Bird.....	7.00	4.12	5.00
Hertford Truck Grower.....	6.00	5.77	5.00
Tankage and Fish Substitute, Peruvian Guano for Truck.....	6.00	4.12	7.00
Nun-Such Potato Grower.....	6.00	4.12	7.00
Sulphate Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Dried Fish.....	....	9.07	....
Muriate of Potash.....	....	....	49.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

The Eureka Fertilizer Co., Perryville, Md.—

Camden Special.....	8.00	2.05	3.00
High Grade Truck.....	8.00	1.64	10.00
Farmers' Favorite.....	8.00	1.64	2.00
White Potato Special.....	6.00	4.11	7.00

Elba Manufacturing Co., Maxton, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Elba Melon Grower.....	8.00	4.12	7.00
Elba Superior Fertilizer.....	8.00	3.30	4.00
Elba High Grade Fertilizer.....	8.00	3.30	4.00
Elba Gold Seal Fertilizer.....	8.00	2.47	3.00
Elba Champion Fertilizer.....	8.00	2.47	3.00
Elba Uncle Tom Fertilizer.....	8.00	2.47	3.00
Elba Standard Fertilizer.....	8.00	1.65	2.00
Elba Hornets Nest Fertilizer.....	6.00	5.75	5.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Farmers' Fertilizer Co., Spartanburg, S. C.—

Phosphoric Acid.....	16.00	....	....
Phosphoric Acid.....	14.00	....	....
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Blood and Bone.....	9.00	1.64	3.00
Beats All 9-2-2.....	9.00	1.64	2.00
Standard	8.75	1.64	2.00
Blood, Bone and Potash.....	8.75	1.64	2.00
Farmers' Favorite H. G. Fertilizer.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Special Corn Fertilizer.....	8.00	1.64	4.00
Standard Grade Fertilizer.....	8.00	1.64	4.00
Standard Grade	8.00	1.64	2.00

Farmers Guano Co., Raleigh, N. C.—

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Farmers Acid Phosphate.....	13.00	....	....
Special Bone and Potash Mixture.....	10.00	....	4.00
Century Bone and Potash Mixture.....	10.00	....	2.00
Farmers Blood and Bone.....	8.00	3.29	4.00
Money Point Guano.....	8.00	2.47	3.00
Golden Grade Guano.....	8.00	2.47	3.00
Big Crop Guano.....	8.00	2.06	3.00
Toco Tobacco Guano.....	8.00	2.06	3.00
State Standard Guano.....	8.00	1.65	2.00
Special Bone and Potash.....	8.00	....	4.00
Farmers Formula.....	7.00	2.47	3.25
Farmers Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Floradora Guano Co., Laurinburg, N. C.—

Humus	10.00	3.29	5.00
Rocky Ford.....	10.00	2.47	7.00
North Robeson Special.....	9.00	1.65	4.00
Florena	8.00	3.29	4.00
Floradora	8.00	3.29	4.00
Oceola	8.00	2.47	3.00
Rob Roy.....	8.00	2.47	3.00
Red Raven.....	8.00	1.65	3.00
Bostick's High Grade.....	7.00	3.29	5.00
Scotland Special.....	6.40	2.13	3.00

Farmville Oil and Fertilizer Co., Farmville, N. C.—

XXX High Grade Acid Phosphate.....	18.00	....	....
XX High Grade Acid Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
FFF Bone and Potash.....	12.00	....	4.00
Farmville High Grade (C. S. M.).....	10.00	2.47	4.00
Davis's Corn Grower.....	10.00	.82	5.00
Pitt County Corn Grower.....	10.00	.82	4.00
Farmville's Favorite Fertilizer.....	9.00	2.90	5.00
Big Leaf (Tobacco Grower).....	9.00	2.88	4.00
Greene County Special (for tobacco).....	9.00	2.67	5.00
Willow Green (Cotton Grower).....	9.00	2.26	2.00
Scientific Cotton Grower.....	9.00	2.26	2.00
Specific Cotton Grower.....	9.00	2.26	2.00
East Carolina Cotton Grower.....	9.00	2.25	2.00
Davis's Special Guano.....	8.00	3.70	7.00
Carolina Chief.....	8.00	3.30	4.00
Lang's Favorite.....	8.00	3.30	4.00
Farmville Special.....	8.00	3.30	4.00
Turnage's Fish Scrap Mixture.....	8.00	3.30	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Harriss's Bright Leaf Tobacco Grower.....	8.00	3.30	4.00
Obelisk	8.00	3.00	4.00
Pride of Farmville.....	8.00	3.29	3.00
Uncle Sam's Tobacco Grower.....	8.00	3.29	3.00
Pride of Pitt.....	8.00	2.47	4.00
Harriss's Special Tobacco Grower.....	8.00	2.47	3.00
Turnage's Fish Scrap Mixture.....	8.00	2.47	3.00
Congo	8.00	2.47	3.00
Pride of Grimmersburg.....	8.00	2.47	3.00
Davis's High Grade Tobacco Manure.....	8.00	2.47	3.00
Marlboro Tobacco Grower.....	8.00	2.47	3.00
Golden Crown.....	8.00	2.47	3.00
Marlboro Cotton Grower (C. S. M.).....	8.00	2.47	3.00
Chamblee & Sons Special.....	8.00	2.26	2.00
Pitt County Cotton Grower.....	8.00	2.25	4.50
Perfect Tobacco Guano.....	8.00	2.06	3.00
Pollard's Special Formula.....	8.00	2.05	5.00
Contentnea Special	8.00	2.05	3.00
Perfect Tobacco Guano.....	8.00	2.05	3.00
Cotton King	8.00	2.00	4.00
Davis's Cotton Grower.....	8.00	1.65	2.00
Carolina Standard	8.00	1.65	2.00
Farmville Standard (C. S. M.).....	8.00	1.65	2.00
Farmville's Bone Mixture.....	8.00	1.65	2.00
Second Application (for cotton).....	6.00	4.10	4.00
Lang's High Grade Tobacco Manure.....	6.00	2.88	6.00
Evergreen Top Dresser.....	4.00	8.24	4.00
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Fremont Oil Mills, Fremont, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Fremont High Grade Bone and Potash.....	10.00	....	4.00
Fremont Oil Mill Co.'s Bone and Potash.....	10.00	....	2.00
Carolina C. S. M. Compound.....	9.00	2.26	2.00
Fremont High Grade Guano.....	8.00	3.29	4.00
Fremont Oil Mill Co.'s Special Tobacco.....	8.00	2.47	5.00
Fremont Tobacco Guano.....	8.00	2.47	5.00
Fremont Standard Fertilizer.....	8.00	2.47	3.00
Wayne County Standard.....	8.00	2.47	3.00
Nahunta Special	8.00	2.47	3.00
Square Deal	8.00	2.05	3.00
Up-to-date	8.00	1.65	2.00
Home Run	8.00	1.65	2.00
F. O. M. Co. Top Dresser.....	3.00	7.40	5.00
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
Sulphate of Potash.....	....	....	48.00

Farmers Cotton Oil Co., Wilson, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Bonum Acid Phosphate.....	14.00	....	....
Contentnea Acid Phosphate.....	13.00	....	....
Washington's Corn Mixture Guano.....	10.00	.82	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Xtra Good Bone and Potash.....	10.00	....	2.00
Dean's Special Guano.....	8.00	3.70	7.00
Regal Tobacco Guano.....	8.00	2.88	5.00
Newsome's Tobacco Special.....	8.00	2.47	4.00
J. D. Farrior's Special Guano.....	8.00	2.47	3.00
Graves' Cotton Grower Guano.....	8.00	2.47	3.00
Golden Gem Guano.....	8.00	2.47	3.00
Wilson High Grade Guano.....	8.00	2.27	2.00
Planters' Friend Guano.....	8.00	2.06	3.00
Carolina Choice Tobacco Guano.....	8.00	2.06	3.00
Crop King Guano.....	8.00	1.65	2.00
Farmers' Special Guano.....	8.00	1.65	2.00
Rogers' Truck Grower.....	7.00	5.76	7.00
Wilson Top Dresser.....	2.00	9.05	4.00
Perfect Top Dresser.....	2.00	8.23	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.63	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

*Franklin Cotton Oil and Fertilizer Co., Inc., Frank-
lin, Va.—*

Pretlow & Co.'s H. G. Acid Phosphate.....	16.00	....	....
Pretlow & Co.'s H. G. Truck Fertilizer.....	8.00	4.12	5.00
Pretlow & Co.'s Cotton-seed Meal Mixture....	8.00	2.47	3.00
Pretlow & Co.'s Champion Guano.....	8.00	1.65	2.00
Pretlow & Co.'s Peanut Grower.....	8.00	1.00	4.00
Pretlow & Co.'s H. G. 7 Per Cent Guano.....	7.00	5.76	7.00
Pretlow & Co.'s Genuine German Kainit.....	....	....	12.00

Griffith & Boyd Co., Baltimore, Md.—

High Grade Acid Phosphate.....	16.00	....	....
Nitrate of Soda.....	....	15.66	....

Germofert Manufacturing Co., Charleston, S. C.—

Grain Fertilizer	5.00	.82	6.00
Fruit and Flower Fertilizer.....	2.00	3.29	6.00

Georgia Chemical Works, Augusta, Ga.—

High Grade Dissolved Bone Phosphate.....	16.00	....	....
Extra Dissolved Bone Phosphate.....	14.00	....	....
Dissolved Bone Phosphate.....	13.00	....	....
12 Per Cent Dissolved Bone Phosphate.....	12.00	....	....
High Grade XX Acid Phosphate with Potash.	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Cardinal High Grade.....	8.00	3.29	4.00
Intensive Formula	8.00	2.47	3.00
Three Oaks High Grade Guano.....	8.00	2.47	2.00
Georgia Formula	8.00	1.65	2.00
Gem Crop Grower.....	9.00	1.65	2.00
XXX Meal Mixture.....	8.00	1.65	2.00
Acid Phosphate with 4 Per Cent Potash.....	8.00	....	4.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>German Kali Works, Baltimore, Md.—</i>			
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
<i>R. C. Gilliam, Norfolk, Va.—</i>			
Gilliam's Special 5 Per Cent Guano.....	7.00	4.11	5.00
Gilliam's Special Potato Guano.....	6.00	5.76	6.00
Gilliam's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
<i>Home Fertilizer and Chemical Co., Baltimore, Md.—</i>			
Champion Dissolved Phosphate.....	16.00	....	....
Boykin's High Grade Acid Phosphate.....	14.00	....	....
Boykin's Dissolved Animal Bone.....	12.00	1.65	....
Gilt Edge Crop Grower.....	10.00	1.65	4.00
Home Bone and Potash.....	10.00	....	5.00
Boykin's Alkaline Bone.....	10.00	....	2.00
Home Ammoniated Bone.....	9.00	1.65	3.00
Home B. G. Ammoniated Compound.....	9.00	.82	5.00
Everybody's Fertilizer	9.00	.82	2.00
Home Standard Guano.....	8.00	3.29	4.00
Riosa Tobacco Compound.....	8.00	2.48	3.00
Special C. & C. Compound.....	8.00	2.48	3.00
Yancey's Formula for Yellow Leaf Tobacco...	8.00	2.48	2.00
Phoenix Crop Grower.....	8.00	2.48	2.00
Home Potato Special.....	8.00	1.65	10.00
Matchless Guano	8.00	1.65	4.00
Boykin's Cereal Fertilizer.....	8.00	1.65	2.00
Ammoniated Bone Manure.....	7.00	1.65	5.00
Farmers' Choice	7.00	.82	4.00
Truckers' Special Compound.....	6.00	5.77	5.00
Boykin's Vegetable Fertilizer.....	6.00	4.12	6.00
Boykin's Home Potato Grower.....	6.00	3.30	4.00
Cerealite Top Dresser.....	....	7.43	3.00
Home Fertilizer .....	....	5.77	7.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
German Kainit.....	....	....	12.00
<i>Hadley, Harris & Co., Wilson, N. C.—</i>			
Hadley's Special 8-4½-7 Mixture.....	8.00	3.70	7.00
Hadley's Tobacco and Cotton Special.....	8.00	2.47	5.00
Golden Weed Tobacco Grower.....	8.00	2.47	3.00
Hadley Boss Guano.....	8.00	2.26	2.50
Daisy Fish Mixture.....	8.00	1.65	2.00
Top Dressing	2.00	8.23	5.00
Nitrate of Soda.....	....	15.60	....
German Kainit .....	....	....	12.00
<i>Hampton Guano Co., Norfolk, Va.—</i>			
Pure Ground Bone.....Total	20.00	3.70	....
Supreme Acid Phosphate.....	16.00	....	....
Hampton Acid Phosphate.....	14.00	....	....
Hampton Bone and Potash Mixture.....	11.00	....	2.00
Hampton Crop Grower.....	10.00	....	4.00
Dauntless Potash Mixture.....	10.00	....	2.00
Arlington Animal Bone Fertilizer.....	9.00	1.85	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Alpha Crop Grower.....	8.50	2.06	2.50
Little's Favorite Crop Grower.....	8.00	3.29	4.00
Hampton Tobacco Guano.....	8.00	2.47	3.00
P. P. P. (Princess Prolific Producer).....	8.00	2.47	3.00
Extra Tobacco Guano.....	8.00	1.65	2.00
Shirley Superphosphate	8.00	1.65	2.00
Hampton Special Grain and Peanut Fertilizer.	8.00	1.00	4.00
Excelsior Bone and Potash.....	8.00	....	4.00
Reliance Truck Guano.....	7.00	4.11	5.00
Virginia Truck Grower.....	6.00	5.76	5.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

S. B. Harrell & Co., Inc., Norfolk, Va.—

Harrell's Acid Phosphate.....	14.00	....	....
Harrell's Eclipse	9.00	2.26	2.00
Harrell's Champion Cotton and Peanut Grower	8.00	1.65	2.00
Harrell's Truck Guano.....	6.00	5.76	5.00

M. P. Hubbard & Co., Baltimore, Md.—

Hubbard's Soluble S. C. Phosphate.....	16.00	....	....
Hubbard's Havana Special for Tobacco.....	8.00	2.48	3.00
Hubbard's Celebrated Phosphate.....	8.00	1.65	2.00
Hubbard's Maryland Special Vegetable Grower	7.00	4.13	5.00
Hubbard's Special Cotton and Corn Fertilizer.	7.00	1.65	5.00
Hubbard's 7 Per Cent Bermuda Guano.....	6.00	5.78	5.00
Nitrate of Soda.....	....	15.60	....
Ground Fish .....	....	8.25	....
Muriate of Potash.....	....	....	50.00

The Hubbard Fertilizer Co., Baltimore, Md.—

Hubbard's 14 Per Cent Phosphate.....	14.00	....	....
Hubbard's Special Mixture 10 and 4.....	10.00	....	4.00
Hubbard's B. and P. 10 and 2.....	10.00	....	2.00
Hubbard's Noxall	8.00	3.28	4.00
Hubbard's Royal Ensign.....	8.00	2.46	4.00
Hubbard's Yellow Wrapper.....	8.00	2.46	3.00
Hubbard's Fish Compound.....	8.00	1.64	3.00
Hubbard's Exchange Guano.....	8.00	1.64	2.00
Hubbard's Southern Leader.....	7.00	3.28	5.00
Hubbard's 5 Per Cent Royal Seal.....	6.00	4.10	5.00
Hubbard's Heavy Long Leaf.....	4.00	3.28	6.00
Hubbard's New Process Top Dresser.....	7.51	3.50
Pure German Kainit.....	12.00

L. Harvey & Son Co., Kinston, N. C.—

Nitrate of Soda.....	15.00
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Harby & Co., Sumter, S. C.—

Nitrate of Soda.....	14.85
Muriate of Potash.....	49.00
German Kainit	12.00

Interstate Chemical Co., Charleston, S. C.—

Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Acid Phosphate	13.00	....	....
Acid Phosphate with Potash.....	11.00	....	1.00
Acid Phosphate with Potash.....	10.00	....	4.00
Acid Phosphate with Potash.....	10.00	....	2.00
Complete Fertilizer	9.00	2.06	2.00
Favorite Crop Grower.....	9.00	1.65	2.00
H. G. Ammoniated Fertilizer.....	8.00	3.30	4.00
Planters' Preference Guano.....	8.00	2.49	3.00
Challenge Brand Guano.....	8.00	2.06	2.00
Ammoniated Guano	8.00	1.64	2.00
Acid Phosphate with Potash.....	8.00	....	4.00
Special High Grade Formula.....	7.00	2.47	7.00
Nitrate of Soda.....	....	18.00	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

The Imperial Co., Norfolk, Va.—

Imperial Pure Ground Bone.....Total	20.00	3.70	....
Imperial H. G. Tennessee Acid Phosphate....	16.00	....	....
Imperial High Grade Acid Phosphate.....	14.00	....	....
Imperial Catawba Wheat Grower.....	10.00	....	4.00
Imperial Carolina Wheat Mixture.....	10.00	....	3.00
Imperial Virginia Grain Mixture.....	10.00	....	2.00
Imperial Bone and Potash.....	10.00	....	2.00
Imperial Martin County Special Crop Grower.	9.00	2.26	2.00
Imperial Snowflake Cotton Grower.....	8.00	3.29	4.00
Imperial Tobacco Grower	8.00	3.29	4.00
Imperial N. L. O. Cotton Guano.....	8.00	2.47	3.00
Imperial Tobacco Guano.....	8.00	2.47	3.00
Imperial Yellow Bark Sweet Potato Guano...	8.00	2.47	3.00
Imperial F. and B. Cotton Guano.....	8.00	2.06	3.00
Imperial Bright Tobacco Guano.....	8.00	2.06	3.00
Imperial Tennessee Tobacco Guano.....	8.00	1.65	8.00
Imperial Peanut Guano.....	8.00	1.65	4.00
Imperial Cotton Grower.....	8.00	1.65	2.00
Imperial Peanut and Corn Guano.....	8.00	1.65	2.00
Imperial Champion Guano.....	8.00	1.65	2.00
Imperial Cisco Soluble Guano.....	8.00	1.65	2.00
Imperial Standard Premium.....	8.00	1.65	2.00
Imperial Fish and Bone Grain Grower.....	8.00	.82	4.00
Imperial Yadkin Wheat Grower.....	8.00	....	4.00
Imperial 7-7-7 Potato Guano.....	7.00	5.76	7.00
Imperial High Grade Irish Potato Guano....	7.00	4.11	8.00
Imperial Dawson's Cotton Grower.....	7.00	2.67	2.75
Imperial Roanoke Crop Grower.....	7.00	2.47	2.00
Imperial Asparagus Mixture.....	6.00	4.94	7.00
Imperial 5-6-7 Potato Guano.....	6.00	4.11	7.00
Imperial Williams' Special Potato Guano....	6.00	4.11	5.00
Imperial Fish and Bone.....	6.00	3.29	4.00
Imperial Sweet Potato Guano.....	6.00	1.65	6.00
Imperial 10 Per Cent Guano.....	5.00	8.23	2.50
Imperial Special 7 Per Cent for Potatoes....	5.00	5.76	5.00
Imperial Special Tobacco Guano.....	5.00	3.29	9.00
Imperial Laughinghouse Special Tobacco Guano	4.00	3.29	6.00
Imperial Conetoe Cotton Grower.....	4.00	3.29	4.00
Imperial Cubanola Tobacco Guano.....	4.00	2.47	5.00
Imperial Top Dresser for Cotton.....	2.00	8.23	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Imperial Nitrate of Soda.....	15.00	....
Imperial Ground Fish Scrap.....	8.23	....
Imperial Animal Tankage.....	5.76	....
Imperial Sulphate of Potash.....	50.00
Imperial Muriate of Potash.....	49.00
Imperial Genuine German Kainit.....	12.00

Imperial Cotton Oil Co., Statesville, N. C.—

Imperial 16 Per Cent Acid Phosphate.....	16.00
Imperial High Grade Acid Phosphate.....	14.00	....	....
10-4 Bone and Potash.....	10.00	....	4.00
Imperial Bone and Potash.....	10.00	....	2.00
King Cotton.....	8.00	2.47	3.00
Imperial Corn Grower.....	8.00	2.47	1.50
"Grasoil".....	8.00	1.65	2.00
Imperial Cotton Grower.....	8.00	1.65	2.00

J. T. John, John's Station, N. C.—

Muriate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

N. B. Josey Guano Co., Turboro, N. C.—

Josey's 16 Per Cent Acid Phosphate.....	16.00	....	....
Josey's 14 Per Cent Acid Phosphate.....	14.00	....	....
Josey's Bone and Potash.....	10.00	....	4.00
Josey's Truck Guano.....	8.00	4.10	5.00
Josey's 8-4-4 C. S. Meal and Fish Scrap Guano.....	8.00	3.30	4.00
Josey's Best C. S. Meal and Fish Scrap Guano	8.00	2.47	3.00
Josey's Tip Top C. S. Meal and Fish Scrap Tobacco Guano.....	8.00	2.47	3.00
Josey's Favorite C. S. Meal and Fish Scrap Guano.....	8.00	2.05	2.50
Josey's C. S. Meal Guano.....	8.00	1.65	2.00
Josey's Truck Guano.....	7.00	5.76	....
Josey's Peanut Guano.....	5.50	1.23	5.50
Nitrate of Soda.....	....	15.50	....
Josey's XX Top Dresser.....	....	7.40	4.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Lister's Agricultural Chemical Works, Newark, N. J.—

Lister's 4-1/2-45 Bone Meal.....Total	20.59	3.70	....
Lister's Standard Pure Bone Superphosphate of Lime.....	9.00	1.65	2.00
Lister's Ammoniated Dissolved Bone Phos- phate.....	8.00	2.06	2.00
Lister's Ammoniated Dissolved Bone Phos- phate.....	8.00	2.06	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00

A. S. Lee & Sons Co. (Inc.), Richmond, Va.—

Thomas' Basic Slag.....Total	15.00	....	....
Lee's Corn Fertilizer.....	10.00	....	2.00
Lee's Wheat Fertilizer.....	10.00	....	2.00
Lee's Bone and Potash.....	9.00	....	4.00
Lee's Natural Tobacco Grower.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Lumberton Cotton Oil and Ginning Co.,</i> <i>Lumberton, N. C.—</i>			
Acid Phosphate.....	16.00	....	....
Gold Dollar.....	8.00	3.30	4.00
Stanby	8.00	3.30	4.00
Cottonaid	8.00	2.47	3.00
Silver Dollar	8.00	2.47	3.00
Home Run.....	4.00	6.58	4.00
Genuine German Kainit.....	....	....	12.00
<i>John F. McNair, Laurinburg, N. C.—</i>			
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>E. H. & J. A. Meadows Co., New Bern, N. C.—</i>			
Diamond Acid Phosphate.....	16.00	....	....
Meadows' Diamond Acid Phosphate.....	14.00	....	....
Meadows' Dissolved Bone and Potash Com- pound	10.00	....	2.00
Meadows' Lobos Guano.....	8.00	4.11	5.00
Meadows' Ideal Tobacco Guano.....	8.00	3.29	4.00
Brooks' Special Tobacco Grower.....	8.00	2.47	5.00
Parker's Special Tobacco Guano.....	8.00	2.47	4.00
Dixon's High Grade Tobacco Guano.....	8.00	2.47	3.00
Meadows' Gold Leaf Tobacco Guano.....	8.00	2.47	3.00
Meadows' Roanoke Guano.....	8.00	2.05	3.00
Meadows' All Crop Guano.....	8.00	2.05	2.50
Meadows' Cotton Guano.....	8.00	1.64	2.00
Hookerton Cotton Guano.....	8.00	1.64	2.00
Meadows' Great Cabbage Guano.....	7.00	5.76	7.00
Meadows' Great Potato Guano.....	7.00	4.11	8.00
Meadows' 10 Per Cent Guano.....	6.00	8.23	2.50
Meadows' German Kainit.....	....	....	12.00
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Ground Bone	Total 22.90	2.47	....
Miller's 16 Per Cent Acid Phosphate.....	16.00	....	....
Miller's 14 Per Cent Acid Phosphate.....	14.00	....	....
Corn and Peanut Grower.....	10.50	....	2.25
Corn and Wheat Grower.....	10.50	....	2.25
The Miller Fertilizer Co.'s 10 and 4 Per Cent..	10.00	....	4.00
Clinch	10.00	....	2.00
Trucker	8.00	4.12	5.00
No. 1 Potato and Vegetable Grower.....	8.00	3.71	7.00
Miller's Irish Potato.....	8.00	3.29	4.00
4 Per Cent Tobacco.....	8.00	3.29	4.00
Miller's S-3-6	8.00	2.47	6.00
Standard Phosphate	8.00	2.47	3.00
Tobacco King	8.00	2.47	3.00
Standard	8.00	2.47	3.00
Miller's High Grade.....	8.00	2.06	3.00
Harmony	8.00	2.06	3.00
Special Tobacco Grower.....	8.00	1.65	4.00
Potato and Vegetable Guano.....	8.00	1.65	4.00
Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Farmers' Profit	8.00	1.65	2.00
High Grade Potato.....	6.00	4.12	7.00
Nitrate of Soda.....	....	15.05	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	15.05	....
Muriate of Potash.....	50.00
Sulphate of Potash.....	48.00
Kainit	12.00

*The Mapes Formula and Peruvian Guano Co.,
113 Liberty Street, New York—*

Mapes' Complete Manure, "A" Brand.....	10.00	2.47	2.50
Mapes' Corn Manure.....	8.00	2.47	6.00
Mapes' Vegetable or Complete Manure for Light Soils	6.00	4.94	6.00
Mapes' Economical Potato Manure.....	4.00	3.29	8.00

T. W. Newborn & Co., Kinston, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Genuine German Kainit.....	....	....	12.00

D. B. Martin Co., Richmond, Va.—

Pure Ground Bone.....Total	22.00	2.46	....
Raw Bone Meal.....Total	21.00	3.70	....
Animal Bone Potash Compound.....	16.00	1.65	2.50
Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....
Pure Dissolved Animal Bone.....	12.00	1.64	....
Potash and Soluble Bone.....	12.00	....	5.00
Potash and Soluble Bone.....	12.00	....	3.00
Acid Phosphate	12.00	....	....
Potash and Soluble Bone.....	10.00	....	6.00
Potash and Soluble Bone.....	10.00	....	5.00
Potash and Soluble Bone.....	10.00	....	4.00
Potash and Soluble Bone.....	10.00	....	3.00
Potash and Soluble Bone.....	10.00	....	2.00
Martin's Tobacco Compound.....	9.00	2.26	2.00
Dissolved Organic Compound.....	9.00	1.00	3.00
Martin's High Grade Guano.....	8.75	1.65	2.00
Blood, Bone and Potash.....	8.00	4.10	7.00
Red Star Brand Fertilizer.....	8.00	4.10	5.00
Cotton and Tobacco Guano.....	8.00	3.28	6.00
Martin's Cotton Guano.....	8.00	3.28	4.00
Martin's Red Star Brand.....	8.00	3.28	4.00
Martin's Blue Ribbon Brand Fertilizer.....	8.00	3.28	2.00
Martin's Tobacco Special.....	8.00	2.52	3.00
Martin's Cotton and Tobacco Guano.....	8.00	2.46	5.00
Martin's Bull Head Fertilizer.....	8.00	2.46	3.00
Martin's Special Fertilizer, 8-2½-3.....	8.00	2.26	3.00
Martin's Cotton Guano.....	8.00	2.05	1.00
Martin's Cotton and Tobacco Guano.....	8.00	1.65	5.00
Martin's Cotton and Tobacco Guano.....	8.00	1.65	3.00
Martin's Animal Organic Compound.....	8.00	1.65	3.00
Martin's Slaughter House Special.....	8.00	1.65	2.00
Martin's Wheat Special.....	8.00	1.65	2.00
Martin's Carolina Special for Tobacco.....	8.00	1.65	2.00
Martin's Carolina Cotton.....	8.00	1.65	2.00
Corn and Cereal Special.....	8.00	1.65	2.00
Old Virginia Favorite.....	8.00	1.65	2.00
Martin's Special Potato Manure.....	8.00	1.00	5.00
One-Eight-Four	8.00	1.00	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Martin's Peanut Grower.....	8.00	1.00	4.00
Potash and Soluble Bone.....	8.00	....	20.00
Potash and Soluble Bone.....	8.00	....	4.00
Martin's Top Dresser.....	7.00	8.22	2.50
Martin's Gilt Edge Potato Manure.....	7.00	2.46	10.00
Martin's Claremont Vegetable Grower.....	7.00	2.46	5.00
Martin's 7 Per Cent Guano.....	6.00	5.74	5.00
Martin's Animal Bone Potato Guano.....	6.00	4.10	7.00
Martin's Early Truck and Vegetable Grower..	6.00	3.28	8.00
Martin's Top Dresser.....	5.00	8.22	2.50
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Marietta Fertilizer Co., Atlanta, Ga.—

Marietta XXXX High Grade Acid Phosphate.	16.00
Marietta High Grade Acid Phosphate.....	14.00	....	....
Langford's Special	10.00	1.65	4.00
Cooper's High Grade Guano.....	10.00	1.65	2.00
Fish Compound	10.00	1.65	2.00
Royal Seal Guano.....	10.00	1.65	2.00
Tonawando Guano	10.00	1.65	2.00
Marietta Potash Special.....	10.00	....	4.00
Dissolved Bone Potash.....	10.00	....	2.00
Marietta Cotton Grower.....	9.00	2.47	3.00
Marietta Boll Producer.....	9.00	1.65	3.00
Marietta Fertilizer, No. 844.....	8.00	3.30	4.00
Marietta Tobacco Special.....	8.00	2.47	3.00
Marietta Fertilizer, No. 823.....	8.00	2.47	3.00
Marietta Fertilizer, No. 836.....	8.00	2.47	6.00
Marietta Best for Tobacco.....	8.00	2.06	3.00
Marietta Sweet Potato Special.....	8.00	2.06	3.00
Marietta Special Potato.....	8.00	1.65	10.00
Marietta Fruit and Root Special.....	8.00	1.65	5.00
Marietta Fertilizer, No. 823.....	8.00	1.65	3.00
Marietta Guano.....	8.00	1.65	2.00
Marietta Manure Substitute.....	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

Marsh-Lee & Co., Marshville, N. C.—

Marsh's Acid.....	16.00
Marsh's Acid.....	14.00	....	....
Marsh's Special High Grade.....	8.00	2.47	3.00
Marsh's Cotton Fertilizer.....	8.00	1.65	2.00
Marsh's Guano for Corn.....	8.00	1.65	2.00

The MacMurphy Co., Charleston, S. C.—

High Grade Acid Phosphate, 14 Per Cent.....	14.00	....	....
Acid Phosphate.....	13.00	....	....
Acid Phosphate and Potash.....	10.00	....	5.00
Acid Phosphate and Potash.....	10.00	....	4.00
Acid Phosphate and Potash.....	10.00	....	2.00
Wilcox & Gibbs Co.'s Manipulated Guano.....	9.00	2.26	2.00
Special Cotton and Corn 8.75-2-3.....	8.75	1.65	2.00
Special 8-4-6 Guano.....	8.00	3.29	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Special 8-4-4 Cotton Guano.....	8.00	3.29	4.00
Special 8-4-4 Tobacco Guano.....	8.00	3.29	4.00
Special 8-3-3 Cotton and Corn.....	8.00	2.47	3.00
Special 8-3-3 Tobacco Guano.....	8.00	2.47	3.00
Standard 8-2 $\frac{1}{2}$ -1 Guano.....	8.00	2.06	1.00
Special 8-2-2 Guano.....	8.00	1.65	2.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Pure German Kainit.....	....	....	12.00

Marlboro Fertilizer Co., Bennettsville, S. C. —

Marlboro Perfection Acid Phosphate.....	16.00
Marlboro High Grade Acid Phosphate.....	14.00	....	....
Marlboro Standard Acid Phosphate.....	13.00	....	....
Marlboro Perfection 8-4-4.....	8.00	4.00	4.00
Marlboro Special 8-4-4.....	8.00	4.00	4.00
Marlboro High Grade 8-3-3.....	8.00	3.00	3.00
Marlboro Excelsior 8-3-3.....	8.00	3.00	3.00
Marlboro Complete Fertilizer.....	7.00	3.00	12.00
Marlboro Fertilizer Co.'s Special Top Dresser.	4.00	10.00	3.00
Marlboro County Top Dresser.....	....	9.00	3.00
Marlboro German Kainit.....	....	....	12.00

Martin & White Co., Norfolk, Richmond and Baltimore—

Phosphate and Potash.....	12.00	....	5.00
Phosphate and Potash.....	12.00	....	3.00
Phosphate and Potash.....	10.00	....	5.00
Phosphate and Potash.....	10.00	....	4.00
Phosphate and Potash.....	10.00	....	2.00
H. G. Cotton and Tobacco Guano.....	8.00	3.28	4.00
Manure Substitute	8.00	3.28	4.00
Horse Shoe Brand.....	8.00	2.46	3.00
Organic Cotton Grower.....	8.00	2.46	3.00
Fish Guano	8.00	1.65	3.00
Fruit Special	8.00	1.65	2.00
Big Crop Grower.....	8.00	1.65	2.00
Special Peanut Grower.....	8.00	1.05	4.00
Royal Crop Grower.....	8.00	1.00	4.00
Blood, Bone and Potash.....	7.00	4.10	8.00
Special Seven Per Cent Trucker.....	6.00	5.74	5.00
Special Potato Grower.....	6.00	4.10	7.00
Virginia Trucker	6.00	3.38	4.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

North Carolina Cotton Oil Co., Wilmington, N. C.—

Wilmington Mortgage Lifter.....	9.00	2.27	2.00
Wilmington Prolific Crop Grower.....	9.00	2.27	2.00
Wilmington's Pride	8.00	4.12	7.00
Wilmington Truck Grower.....	8.00	3.30	4.00
Bullock's High Grade.....	8.00	3.29	4.00
Wilmington Full Value.....	8.00	3.29	4.00
Best Tobacco Grower.....	8.00	2.47	7.50
John's Special.....	8.00	2.47	4.00
Bullock's Cotton Grower.....	8.00	2.47	4.00
The Stone Company Special.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Clute's Cotton Grower.....	8.00	2.47	3.00
Wilmington Leader.....	8.00	2.47	3.00
Wilmington Farmer Boy.....	8.00	2.47	4.00
Wilmington High Grade.....	8.00	2.47	3.00
L. P. B. Special.....	8.00	2.47	3.00
Lewis' Special.....	8.00	2.47	3.00
Carter's Lifter.....	8.00	2.47	3.00
Wilmington Standard.....	8.00	2.47	2.50
Pate's Special.....	8.00	2.47	2.00
Currie's Crop Grower.....	8.00	2.06	4.00
Wilmington Tobacco Grower.....	8.00	2.06	3.00
Wilmington Banner.....	8.00	1.65	3.00
Clark's Special.....	8.00	1.65	3.00
Wilmington Cotton Grower.....	8.00	1.65	2.00
Wilmington Special.....	8.00	1.65	2.00
Wilmington Headlight.....	6.00	3.29	8.00
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
<i>North Carolina Cotton Oil Co., Raleigh, N. C.—</i>			
Raleigh Standard Guano.....	8.00	2.26	2.00
<i>North Carolina Cotton Oil Co., Charlotte, N. C.—</i>			
Dixie Standard.....	8.00	2.48	3.00
Majestic.....	8.00	1.65	2.00
<i>North Carolina Cotton Oil Co., Henderson, N. C.—</i>			
Two in One.....	10.00	3.28	4.00
Henderson Tobacco Fertilizer.....	9.00	2.47	3.00
Franklin Tobacco Fertilizer.....	9.00	2.47	3.00
Pride of Vance Tobacco Fertilizer.....	9.00	2.47	3.00
Uneedit Tobacco Fertilizer.....	9.00	2.47	3.00
Two in One.....	8.00	3.29	4.00
McKinne Mixture.....	8.00	2.26	3.25
Brewer's Special.....	8.00	2.26	2.00
Henderson Cotton Grower.....	8.00	1.65	2.00
Franklin Cotton Grower.....	8.00	1.65	2.00
Uneedit Cotton Grower.....	8.00	1.65	2.00
Vance Cotton Grower.....	8.00	1.65	2.00
<i>Nitrate Agencies Co., New York, Baltimore, Savannah, Charleston and Norfolk—</i>			
Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
Nitrate of Soda, 95 Per Cent.....	....	15.65	....
Nitrate of Soda.....	....	15.50	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	50.00
Kainit.....	....	....	12.00
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Special Corn and Peanut Grower.....	11.00	....	2.00
High Grade Bone and Potash.....	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Carteret Bone and Potash.....	10.00	....	2.00
Oriole Tobacco Grower.....	8.00	3.30	4.00
Harvey's Special Meal and Fish Guano.....	8.00	2.47	3.00
Foy's High Grade Fertilizer.....	8.00	2.47	3.00
Lenoir Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Pitt's Prolific Golden Tobacco Guano.....	8.00	2.47	3.00
Favorite Cotton Grower.....	8.00	2.27	2.00
Onslow Farmers' Reliance Guano.....	8.00	2.06	3.00
Jones County Premium Crop Grower.....	8.00	2.06	3.00
Craven Cotton Guano.....	8.00	1.65	2.00
Greene County Standard Fertilizer.....	8.00	1.65	2.00
Dunn's Standard Truck Grower.....	7.00	5.77	7.00
Ives' Irish Potato Guano.....	7.00	4.12	7.00
Eureka Tobacco Fertilizer.....	6.00	3.30	7.00
Pamlico Electric Top Dresser.....	5.00	8.25	2.50
Wooten's Special Tobacco Guano.....	4.00	3.30	6.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	15.67	....
High Grade Fish Scrap.....	....	8.25	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Norfolk Fertilizer Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Oriana 16 Per Cent Acid Phosphate.....	16.00	....	....
Whitney High Grade Acid Phosphate.....	16.00	....	....
Oriana 14 Per Cent Acid Phosphate.....	14.00	....	....
Oriana Wheat Grower.....	10.00	....	4.00
Shenandoah Wheat Mixture.....	10.00	....	3.00
Young's Grain Grower.....	10.00	....	2.00
Oriana Bone and Potash.....	10.00	....	2.00
Oriana C. S. M. Special.....	9.00	2.26	2.00
Oriana Complete Fertilizer.....	8.00	3.29	4.00
Oriana First Step Tobacco Guano.....	8.00	3.29	4.00
Oriana Tobacco Guano.....	8.00	2.47	3.00
Oriana for Cotton.....	8.00	2.47	3.00
Oriana Cotton Guano.....	8.00	1.65	2.00
Oriana Crop Grower.....	8.00	1.65	2.00
Mayodan Valley Wheat Grower.....	8.00	....	4.00
Oriana Special Mixture.....	6.00	4.11	5.00
Oriana Truck Guano.....	5.00	5.76	5.00
Pine Top Special Crop Grower.....	5.00	1.65	6.00
H. G. Tobacco Guano.....	4.00	3.29	6.00
Nitrate of Soda Mixture for Top Dressing Cotton	2.00	8.23	....
Nitrate of Soda.....	....	15.00	....
Ground Fish .....	....	8.23	....
Animal Tankage .....	....	5.76	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Navassa Guano Co., Wilmington, N. C.—

Navassa Acid Phosphate.....	17.00	....	....
Navassa Acid Phosphate.....	16.00	....	....
Navassa 14 Per Cent Acid Phosphate.....	14.00	....	....
Navassa Dissolved Bone.....	13.00	....	....
Navassa Special Wheat Mixture.....	12.00	....	4.00
Navassa Gray Land Mixture.....	12.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Navassa Acid Phosphate.....	12.00	....	....
Maxim Guano	10.00	2.47	2.00
Corona Guano	10.00	1.65	2.00
Navassa Wheat and Grass Grower.....	10.00	....	4.00
Navassa Wheat Mixture.....	10.00	....	2.25
Navassa Dissolved Bone with Potash.....	10.00	....	2.00
Navassa Fish Guano.....	9.00	2.47	3.00
Navassa Manipulated Guano.....	9.00	2.26	2.00
Osceola Guano	9.00	1.65	3.00
Harvest Queen Fertilizer.....	9.00	1.65	2.00
Navassa Complete Fertilizer.....	9.00	1.65	1.00
Farmers' Special Mixture.....	8.75	2.25	4.00
Navassa Universal Fertilizer.....	8.50	2.06	1.00
Navassa Special Truck Guano.....	8.00	3.29	4.00
Coree Tobacco Guano.....	8.00	3.29	4.00
Navassa Carib Guano.....	8.00	2.47	10.00
Navassa Blood and Meal Mixture.....	8.00	2.47	5.00
Orton Guano	8.00	2.47	4.00
Navassa High Grade Guano.....	8.00	2.47	3.00
Clarendon Tobacco Guano.....	8.00	2.47	3.00
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8.00	2.47	2.00
Navassa Strawberry Top Dressing.....	8.00	2.06	4.00
Mogul Guano	8.00	2.06	3.00
Navassa Guano for Tobacco.....	8.00	2.06	2.00
Ammoniated Soluble Navassa Guano.....	8.00	2.06	2.00
Brooks' Ammoniated Guano.....	8.00	2.06	1.50
Navassa Fruit Grower Fertilizer.....	8.00	1.65	6.00
Harvest King Guano.....	8.00	1.65	3.00
Clark's Special Cotton-seed Meal Guano.....	8.00	1.65	3.00
Navassa Grain Fertilizer.....	8.00	1.65	2.00
Navassa Cotton-seed Meal Guano.....	8.00	1.65	2.00
Navassa Cotton Fertilizer.....	8.00	1.65	2.00
Ocoeechee Tobacco Guano.....	8.00	1.65	2.00
Navassa Dissolved Bone with Potash.....	8.00	....	4.00
Navassa Lettuce Grower Fertilizer.....	7.00	7.00	7.00
Navassa Root Crop Fertilizer.....	7.00	4.12	7.00
Navassa Creole Guano.....	6.00	4.12	7.00
Navassa H. G. Top Dresser.....	4.00	7.82	4.00
Navassa Top Dresser	4.00	6.17	2.50
Sulphate of Ammonia.....	....	20.59	....
Nitrate of Soda.....	....	14.82	....
Blood .....	....	13.15	....
Fish Scrap .....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

G. Ober & Sons Co., Baltimore, Md.—

Pure Raw Bone Meal.....Total	21.00	3.71	....
Ober's High Grade Acid Phosphate.....	16.00	....	....
Ober's Dissolved Bone Phosphate.....	14.00	....	....
Ober's Standard Potash Compound.....	12.00	....	5.00
Ober's Dissolved Animal Bone.....	10.00	2.47	....
Ober's Dissolved Bone, Phosphate and Potash.	10.00	....	2.00
Ober's Special High Grade Fertilizer.....	9.00	2.47	3.00
Ober's Special Ammoniated Dissolved Bone...	9.00	1.65	2.00
Ober's Farmers' Mixture.....	9.00	.82	2.00
Ober's H. G. Fertilizer.....	8.00	3.30	4.00
Ober's Special Compound for All Crops.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Ober's Special Compound for Tobacco.....	8.00	2.47	3.00
Cooper's Pungo Guano.....	8.00	2.06	2.00
Ober's Standard Tobacco Fertilizer.....	8.00	1.65	2.00
Ober's Special Cotton Compound.....	8.00	1.65	2.00
Ober's Soluble Ammoniated Superphosphate of Lime	8.00	1.65	2.00
Ober's Stag Guano.....	8.00	.82	4.00
Ober's Acid Phosphate with Potash.....	8.00	....	4.00
Ober's Complete Fertilizer.....	6.00	4.12	6.00
Ober's Special Potash Compound for Tobacco.	6.00	2.47	7.00
Ober's Special Tobacco Bed Fertilizer, 10 Per Cent	4.00	8.25	3.00
Nitrate of Soda.....	....	15.50	....
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

The Pocomoke Guano Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Superb Acid Phosphate.....	16.00	....	....
Peerless Acid Phosphate.....	14.00	....	....
Alkali Bone	11.00	....	2.00
Pocomoke Bone and Potash Mixture.....	10.00	....	4.00
10-2 Potash Mixture.....	10.00	....	2.00
Monticello Animal Bone Fertilizer.....	9.00	1.85	4.00
Cinco Tobacco Guano.....	8.50	2.06	2.50
Pocomoke Superphosphate	8.50	1.65	2.00
Electric Crop Grower.....	8.50	1.65	2.00
Garrett's Grape Grower.....	8.00	3.29	10.00
Faultless Ammoniated Superphosphate.....	8.00	3.29	4.00
Pocomoke Sweet Potato Grower.....	8.00	2.47	3.00
Harvey's High Grade Monarch.....	8.00	2.47	3.00
Monarch Tobacco Grower.....	8.00	2.47	3.00
C. C. C. (Crescent Complete Compound).....	8.00	1.65	3.00
Pamlico Superphosphate	8.00	1.65	2.00
Pocomoke Wheat, Corn and Peanut Manure..	8.00	1.00	4.00
Pocomoke Defiance Bone and Potash.....	8.00	....	4.00
Standard Truck Guano.....	7.00	4.11	5.00
Freeman's 7 Per Cent Irish Potato Grower...	6.00	5.76	5.00
Seaboard Popular Trucker.....	6.00	5.76	5.00
Coast Line Truck Guano.....	5.00	8.23	3.00
Smith's Special Formula.....	4.00	3.29	6.00
Nitrate of Soda.....	....	15.00	....
Ground Fish .....	....	8.23	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Peruvian Guano Corporation, Charleston, S. C.—

Peruvian Guano Ex. S. S. Caithness-shire....	18.00	3.08	2.40
Acid Phosphate	16.00	....	....
Peruvian Guano Ex. S. S. Chipana.....	14.00	3.29	2.00
Peruvian Guano Ex. S. S. Condor.....	14.00	2.46	2.00
Peruvian Guano Ex. S. S. Belle of Scotland..	14.00	2.14	1.70
Acid Phosphate	14.00	....	....
Peruvian Guano Ex. S. S. Capae.....	13.00	4.93	2.00
Acid Phosphate	13.00	....	....
Peruvian Guano Ex. S. S. Chipana "Lobos Isl".	12.00	2.88	2.00
Peruvian Guano Ex. S. S. Chipana "Bellestas".	11.00	6.78	2.75
Peruvian Guano Ex. S. S. Chipana "Smith Isl."	11.00	5.76	2.00
Peruvian Guano Ex. S. S. Belle of Scotland...	10.00	4.11	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
"Chincha Island" High Grade Peruvian Mix- ture	10.00	3.29	4.00
"Penguin" Peruvian Compound.....	10.00	2.46	3.00
"Albatross" Peruvian Formula.....	10.00	1.64	4.00
Peruvian Top Dresser.....	8.00	6.99	3.50
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	14.80	....
Dried Blood .....	....	13.10	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Pamlico Chemical Co., Washington, N. C.—

Bissett's Special Cotton Grower.....	9.00	2.06	4.00
Pamlico 16 Per Cent Acid Phosphate.....	16.00	....	....
Pamlico Bone Phosphate.....	14.00	....	....
Pamlico Peanut Guano.....	10.00	....	4.00
Dissolved Bone and Potash.....	10.00	....	2.00
Pitt County High Grade Tobacco Guano.....	9.00	2.88	10.00
Blount's Special Cotton Grower.....	9.00	2.27	2.00
Prosperity Cotton Grower.....	9.00	2.26	2.00
United States High Grade Tobacco Guano....	8.00	4.12	10.00
Cowell's Great Potato Grower.....	8.00	4.12	7.00
Pamlico 8-4-4 Guano.....	8.00	3.30	4.00
Bull's Eye Tobacco Grower.....	8.00	3.30	4.00
Early Sweet Potato.....	8.00	2.47	10.00
Pamlico High Grade Tobacco Grower.....	8.00	2.47	5.00
Success Guano	8.00	2.47	3.00
Blount's Special Tobacco Grower.....	8.00	2.47	3.00
Tobacco Growers' Friend.....	8.00	2.47	3.00
Farmers' Best Guano.....	8.00	2.06	3.00
Pamlico Bone and Fish Guano.....	8.00	1.65	2.00
Pamlico Cotton Guano.....	8.00	1.65	2.00
Pamlico 7-7-7 Guano.....	7.00	5.77	7.00
Pamlico Special Irish Potato Guano.....	7.00	4.12	7.00
Pamlico Special Sweet Potato Guano.....	7.00	4.12	5.00
Pamlico Favorite Guano.....	7.00	4.12	5.00
Blount's H. G. Potato Grower.....	7.00	4.12	5.00
Faulkland H. G. Tobacco Guano.....	6.00	2.47	6.00
Acidulated Fish Scrap.....	5.50	7.82	....
Cowell's Great Cabbage Grower.....	5.00	8.25	2.50
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Pamlico Ground Fish.....	....	8.25	....
Sulphate of Potash.....	....	....	55.00
Muriate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

*Planters Fertilizer and Phosphate Co., Charleston,
S. C.—*

16 Per Cent Acid Phosphate.....	16.00	....	....
Planters' High Grade Acid Phosphate.....	14.00	....	....
Excelsior H. G. Acid Phosphate.....	14.00	....	....
Planters' Soluble Bone.....	13.00	....	....
Planters' Bone and Potash.....	12.00	....	1.00
Acid and Potash.....	10.00	5.76	5.00
Planters' Special Meal Mixture.....	10.00	1.65	2.00
Planters' Grain Grower.....	10.00	.82	3.00
Special Mixture	10.00	....	5.00
Planters' Acid and Potash.....	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Planters' Bone and Potash.....	10.00	....	2.00
Planters' Blood and Fish Guano.....	9.00	1.65	3.00
Planters' Special Mixture.....	9.00	.82	3.00
Planters' Special Mixture.....	8.00	4.12	5.00
Planters' Special Cotton Fertilizer.....	8.00	3.29	1.00
Planters' Bright Tobacco Fertilizer.....	8.00	3.29	4.00
Planters' Cotton and Corn Fertilizer.....	8.00	2.47	4.00
Planters' H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Planters' Soluble Guano.....	8.00	2.47	3.00
Planters' Fertilizer	8.00	2.06	2.00
Planters' Standard Fertilizer.....	8.00	1.65	2.00
Planters' Bone and Potash.....	8.00	....	4.00
Special Mixture	7.00	5.76	7.00
Special Mixture	7.00	4.11	7.00
Special Mixture	7.00	4.11	5.00
Planters' H. G. Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	14.83	....
Planters' Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Planters' German Kainit.....	....	....	12.00

Planters Guano Co., Dunn, N. C.—

Uncle Zeb	9.50	2.75	5.00
Bull of the Field.....	8.00	3.00	4.00
Planters' Special	8.00	3.00	3.00
Dunn Hustler	8.00	3.00	3.00
Sampson Cotton Grower.....	8.00	2.00	2.00

Central Phosphate Co., Mount Pleasant, Tenn.—

Tennessee Phosphate Rock.....Total	28.00
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Pearsall & Co., Wilmington, N. C.—

Pearsall's H. G. Acid Phosphate.....	16.00
Pearsall's H. G. Acid Phosphate.....	14.00
Pearsall's Bone and Potash.....	10.00	....	4.00
Davis' Special	8.00	3.29	4.00
Fish and Potash Compound.....	8.00	3.29	4.00
Bone Meal and Fish.....Total	8.00	3.29	4.00
Pearsall's Berry Guano.....	8.00	2.47	10.00
Pearsall's Usume Guano.....	8.00	2.47	3.00
Pearsall's High Grade Tobacco.....	8.00	2.47	3.00
Pearsall's F. F. F. G.....	8.00	2.47	3.00
Currie's Cotton and Corn Guano.....	8.00	1.65	3.00
Pearsall's Corn Guano.....	8.00	1.65	3.00
Pearsall's Eagle	8.00	1.65	2.00
Pearsall's Potato and Truck Guano.....	6.00	4.12	7.00
Nitrate of Soda.....	....	14.85	....
Nitrate of Soda.....	....	14.80	....
Ground Fish .....	....	8.22	....
Pearsall's Top Dresser.....	....	7.42	3.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pacific Guano Co., Charleston, S. C.—

Standard Pacific Acid Phosphate.....	12.00	....	....
Standard Soluble Pacific Guano.....	8.50	1.65	2.00
High Grade Pacific Fertilizer.....	8.00	2.46	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Powhatan Chemical Co., Richmond, Va.—</i>			
Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone Meal.....Total	22.50	3.70	....
Magic Dissolved Bone Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
Powhatan Acid Phosphate.....	13.00	....	....
Magic Corn Special.....	12.00	1.00	2.00
High Grade Bone and Potash Mixture.....	12.00	....	5.00
Virginia Dissolved Bone.....	12.00	....	....
Magic Corn Grower.....	10.00	.82	1.00
Magic Corn Grower.....	10.00	.82	1.00
Magic Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Guilford Special Tobacco Fertilizer.....	9.00	2.47	6.00
Ralling's Special Fertilizer.....	9.00	2.47	2.00
Economic Cotton Grower.....	9.00	2.26	2.00
Johnson's Best Fertilizer.....	9.00	2.06	5.00
Holt's Magic Fertilizer.....	9.00	2.06	5.00
Union Magic Fertilizer.....	9.00	1.85	4.00
North Carolina Favorite.....	9.00	1.65	3.00
Powhatan Special Fertilizer.....	9.00	1.65	2.00
Magic Mixture.....	9.00	1.65	1.00
Magic Wheat Grower.....	9.00	.82	2.00
King Trucker.....	8.00	4.11	5.00
Copeland's Magic Fertilizer.....	8.00	3.29	8.00
North State Special.....	8.00	3.29	4.00
Tomlinson's Special Fertilizer.....	8.00	2.47	5.00
Magic Fertilizer.....	8.00	2.47	4.00
Johnson's Special Fertilizer.....	8.00	2.47	3.00
King Brand Fertilizer.....	8.00	2.06	3.00
P. C. Co.'s Hustler.....	8.00	2.47	3.00
White Leaf Tobacco Fertilizer.....	8.00	2.06	3.00
Magic Cotton Grower.....	8.00	1.65	2.00
Magic Special Fertilizer.....	8.00	1.65	2.00
Magic Tobacco Grower.....	8.00	1.65	2.00
Magic Peanut Special.....	8.00	.82	4.00
Magic Peanut Grower.....	8.00	....	4.00
Magic Grain and Grass Grower.....	8.00	....	4.00
Powhatan Bone and Potash Mixture.....	8.00	....	4.00
Powhatan Trucker.....	7.00	4.94	5.00
Copeland's Special Fertilizer.....	6.00	3.29	7.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Pine Level Oil Mill Co., Pine Level, N. C.—

Pine Level 16 Per Cent Acid Phosphate.....	16.00
Pine Level 14 Per Cent Acid Phosphate.....	14.00	....	....
Bone and Potash Mixture.....	10.00	....	4.00
Sutton's Potato Guano.....	9.00	2.88	5.00
Xantho Tobacco Guano.....	8.00	3.30	4.00
Oliver's Truck Grower Guano.....	8.00	3.30	4.00
Hale's Special for Tobacco.....	8.00	2.47	4.00
Pine Level High Grade.....	8.00	2.47	3.00
Cotton Grower for All Crops.....	8.00	1.65	2.00
H. G. Top Dresser.....	3.00	6.03	6.00
Nitrate of Soda.....	....	15.22	....

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Muriate of Potash.....	48.00
Sulphate of Potash.....	48.00
Genuine German Kainit.....	12.00

Patapsco Guano Co., Baltimore, Md.—

Patapsco Pure Ground Bone.....Total	20.59	3.70
Florida Soluble Phosphate.....	16.00	....	....
Patapsco Pure Dissolved S. C. Phosphate....	14.00	....	....
Patapsco High Grade Phosphate and Potash..	11.00	....	5.00
Baltimore Soluble Phosphate.....	11.00	....	2.00
Patapsco 10 and 4 Potash Mixture.....	10.00	....	4.00
Patapsco Soluble Phosphate and Potash.....	10.00	....	2.00
Patapsco Guano for Tobacco.....	9.25	2.06	2.00
Tankage .....Total	9.15	7.41	....
Patapsco Tobacco Fertilizer.....	9.00	2.47	3.00
Patapsco Cotton and Corn Special.....	9.00	2.06	5.00
Patapsco Guano	9.25	2.06	2.00
Coon Brand Guano.....	9.00	.82	3.00
Patapsco Cotton and Tobacco Special.....	8.00	3.29	4.00
Patapsco Plant Food for Tobacco, Potatoes and Truck	8.00	2.47	5.00
Choctaw Guano	8.00	2.47	3.00
Patapsco Special Tobacco Mixture.....	8.00	2.06	3.00
Unicorn Guano	8.00	2.06	3.00
Swanson's Gold Leaf Special.....	8.00	2.06	2.00
Planters' Favorite	8.00	1.65	2.00
Sea Gull Ammoniated Guano.....	8.00	1.65	2.00
Grange Mixture	8.00	1.65	2.00
Patapsco 7-7-7 Truck Guano.....	7.00	5.76	7.00
Patapsco Trucker for Early Vegetables.....	7.00	4.11	5.00
Money Maker Guano.....	7.00	3.70	6.00
Ground Fish .....Total	6.00	8.23	....
Patapsco Potato Guano.....	6.00	4.11	7.00
Patapsco Crop Dresser.....	4.00	3.29	4.00
Sulphate of Ammonia.....	....	20.16	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pocahontas Guano Co., Lynchburg, Va.—

Fine Ground Bone Meal.....Total	23.00	2.47	....
Pure Raw Bone Meal.....Total	22.00	3.71	....
Pure Raw Bone Meal.....Total	22.00	3.71	....
Carrington's S. C. Phosphate, Waukesha Brand	16.00	....	....
Imperial Dissolved S. C. Phosphate.....	14.00	....	....
Wabash Wheat Mixture.....	10.00	....	4.00
Carrington's Superior Grain Compound.....	10.00	....	2.00
Pocahontas Special Tobacco Fertilizer.....	9.00	2.47	3.00
High Grade 4 Per Cent Tobacco Compound, Mohawk King	9.00	1.85	4.00
Yellow Tobacco Special.....	9.00	1.65	2.00
Standard Tobacco Guano, Old Chief Brand...	9.00	1.65	2.00
Indian Tobacco Grower.....	8.00	2.47	4.00
Farmers' Favorite Apex Brand.....	8.00	2.47	3.00
Special Truck Grower, Eagle Mount Brand...	8.00	2.06	6.00
Spot Cash Tobacco Compound.....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Carrington's Banner Brand Guano.....	8.00	1.65	2.00
A. A. Complete Champion Brand.....	8.00	1.00	3.00
Cherokee Grain Special.....	8.00	....	4.00

Planters Cotton Seed Oil Co., Rocky Mount, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Royal Cotton Grower.....	9.00	2.26	2.00
Gorham H. G. Guano.....	8.00	3.29	4.00
Tar River Special.....	8.00	2.47	3.00
Planters' C. S. Oil Co.'s Tobacco Guano.....	8.00	2.47	3.00
Planters' C. S. Oil Co.'s Cotton Guano.....	8.00	1.65	2.00
Eagle Guano.....	8.00	1.65	2.00
Planters' Special Potato Guano.....	7.00	4.12	5.00
E. L. D. Special.....	7.00	2.47	3.00
Braswell's Special for Tobacco.....	7.00	2.26	3.50
Planters' Top Dresser.....	3.50	7.82	3.00
Nitrate of Soda.....	....	15.65	....
Ground Fish Scrap.....	....	8.23	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Piedmont Bone Meal.....Total	21.00	3.29	....
Piedmont 16 Per Cent Acid Phosphate.....	16.00	....	....
Piedmont 14 Per Cent Acid Phosphate.....	14.00	....	....
Piedmont Special Potash Mixture.....	10.00	....	5.00
Levering's Potashed Bone.....	10.00	....	4.00
Piedmont Farmers' Bone and Potash.....	10.00	....	2.00
Piedmont Farmers' Standard.....	9.00	1.65	2.00
Piedmont Essential Tobacco Compound.....	9.00	1.65	2.00
Piedmont Farmers' Cotton Grower.....	9.00	.82	3.00
Levering's Ammoniated Bone.....	9.00	.82	3.00
Piedmont Special Farmers' Tobacco Guano...	8.40	2.47	4.00
Piedmont General Truck Grower.....	8.00	4.12	5.00
Piedmont 4-8-10 Guano.....	8.00	3.29	10.00
Piedmont Unexcelled Guano.....	8.00	3.29	4.00
Piedmont High Grade Ammoniated Bone and Potash.....	8.00	2.47	3.00
Piedmont High Grade Guano for Cotton.....	8.00	2.47	3.00
Levering's Reliable Tobacco Guano.....	8.00	2.47	3.00
Piedmont Guano for Tobacco.....	8.00	2.06	3.00
Piedmont Guano for All Crops.....	8.00	2.06	3.00
Levering's Standard.....	8.00	1.65	3.00
Piedmont Bone and Peruvian Mixture.....	8.00	1.65	2.00
Piedmont Special for Cotton, Corn and Pea- nuts.....	8.00	1.65	2.00
Piedmont Red Leaf Tobacco Guano.....	8.00	1.65	2.00
Piedmont Cultivator Brand.....	8.00	1.65	2.00
Piedmont Farmers' Favorite.....	8.00	.82	4.00
Piedmont Star Bone and Potash.....	8.00	....	5.00
Piedmont 7-7-7 Truck Guano.....	7.00	5.76	7.00
Piedmont 5-7-8 Guano.....	7.00	4.12	8.00
Piedmont 5-7-5 Guano.....	7.00	4.12	5.00
Piedmont Special Truck Fertilizer.....	6.00	5.76	7.00
Piedmont Special Potato Guano.....	6.00	4.94	7.00
Piedmont Early Vegetable Manure.....	6.00	4.12	7.00
Piedmont Early Trucker.....	6.00	4.12	5.00
Piedmont Vegetable Compound.....	6.00	3.29	8.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Piedmont Potato Producer.....	5.00	2.47	6.00
Sulphate of Ammonia.....	20.58	....
Nitrate of Soda.....	15.22	....
Boykin's Top Dresser.....	7.41	3.00
Muriate of Potash.....	50.00
Sulphate of Potash.....	48.00

The Quinnepiac Co., Charleston, S. C.—

Standard Quinnepiac Acid Phosphate.....	13.00	....	....
Standard Quinnepiac Pine Island Ammoniated Superphosphate	9.00	1.85	1.00

The Robertson Fertilizer Co., Norfolk, Va.—

Robertson's Raw Bone Meal.....Total	21.00	3.71	....
High Peak Acid Phosphate.....	16.00	....	....
Scepter Brand Acid Phosphate.....	14.00	....	....
Robertson's Dissolved Bone.....	13.00	2.06	....
J. W. S. Special Bone and Potash Mixture....	12.00	....	5.00
J. W. S. Alkaline Bone.....	10.00	....	5.00
Skyscraper Bone and Potash Compound.....	10.00	....	4.00
Level Run Dissolved Bone and Potash.....	10.00	....	2.00
Beaver Brand Soluble Guano.....	9.00	1.85	4.00
Robertson's Blood and Bone Mixture.....	9.00	1.00	2.00
P. M. C. High Grade Soluble Guano.....	8.00	4.12	7.00
Wood's Winner H. G. Guano.....	8.00	3.30	4.00
Robertson's Soluble H. G. Guano.....	8.00	2.47	4.00
Robertson's Special Formula for Tobacco....	8.00	2.47	3.00
Big Cropper High Grade Guano.....	8.00	2.47	3.00
Robertson's X-(T) Tobacco Grower.....	8.00	2.06	2.00
Double Dollar Soluble Guano.....	8.00	1.65	2.00
Ten Strike Soluble Crop Producer.....	8.00	1.00	4.00
M. C. Special Bone and Potash Mixture.....	8.00	....	4.00
Tidewater Truck Guano.....	7.00	4.12	5.00
Robertson's 5-6-7.....	6.00	4.12	7.00
Robertson's 7 Per Cent for Truck.....	5.00	5.77	5.00
Robertson's 10 Per Cent Truck Guano.....	2.00	8.25	2.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Fish .....	....	9.04	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

F. S. Royster Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Royster's H. G. 17 Per Cent Acid Phosphate..	17.00	....	....
Royster's H. G. 16 Per Cent Acid Phosphate..	16.00	....	....
Royster's 14 Per Cent Acid Phosphate.....	14.00	....	....
Royster's Dissolved Bone.....	13.00	....	....
Royster's XX Acid Phosphate.....	12.00	....	....
Royster's Bone and Potash Mixture.....	11.00	....	5.00
Royster's Soluble Guano.....	10.00	1.65	2.00
Royster's 10 and 5 Bone and Potash Mixture..	10.00	....	5.00
Royster's 10 and 4 Bone and Potash Mixture..	10.00	....	4.00
Royster's Bone and Potash for Grain.....	10.00	....	3.00
Royster's Bone and Potash Mixture.....	10.00	....	2.00
M. P. F. Mixture.....	9.50	3.30	5.00
Royster's 4-9-5 Special.....	9.00	3.30	5.00
Tomlinson's Special	9.00	2.47	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Royster's Meal Mixture.....	9.00	2.26	2.00
Royster's Cotton Grower.....	9.00	2.26	2.00
Watkins' Special	9.00	2.06	5.00
Haynes' Special	9.00	2.06	3.00
Viking Ammoniated Guano.....	9.00	1.65	3.00
Special Compound	9.00	1.65	1.00
Royster's Special 1-9-2 Guano.....	9.00	.82	2.00
H. B. & Co.'s Special.....	8.00	4.69	10.00
Royster's Best Guano	8.00	3.71	7.00
Cobb's High Grade for Tobacco.....	8.00	3.30	5.00
Trucker's Delight	8.00	3.30	4.00
Milo Tobacco Guano.....	8.00	3.30	4.00
Jupiter High Grade Guano.....	8.00	3.30	4.00
Royster's Special 4-8-3.....	8.00	3.30	3.00
Gorham's Special	8.00	3.30	2.50
Black Wrapper Special Tobacco Guano.....	8.00	3.30	2.00
Eagle's Special Tobacco Guano.....	8.00	2.47	5.00
Bonanza Tobacco Guano.....	8.00	2.47	3.00
Marlboro High Grade Cotton Guano.....	8.00	2.47	3.00
Royster's Special Sweet Potato Guano.....	8.00	2.47	3.00
Williams' Special Guano.....	8.00	2.06	5.00
Orinoco Tobacco Guano.....	8.00	2.06	3.00
Special Tobacco Compound.....	8.00	2.06	2.00
Corbett & Moore's Special.....	8.00	1.65	3.50
Royster's Special Wheat Fertilizer.....	8.00	1.65	2.00
Royster's Complete Guano.....	8.00	1.65	2.00
Farmers' Bone Fertilizer.....	8.00	1.65	2.00
Webb's Korn King.....	8.00	1.65	2.00
Farmers' Bone Fertilizer for Tobacco.....	8.00	1.65	2.00
Jumbo Peanut Grower.....	8.00	1.02	4.00
Royster's 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Battle's Favorite	7.25	3.91	5.25
Royster's Special 7 Per Cent Truck Guano...	7.00	5.77	7.00
Royster's Early Truck Guano.....	7.00	4.12	8.00
Royal Special Potato Guano.....	7.00	4.12	7.00
Royal Potato Guano.....	7.00	4.12	5.00
Pasquotank Potato Guano.....	7.00	3.30	8.00
Royster's Special 13 Per Cent Plant Food....	7.00	2.47	3.00
Royster's Peanut Special.....	7.00	....	5.00
Ballentine's Potato Guano.....	6.00	5.77	7.00
Arrow Potato Guano.....	6.00	5.77	5.00
Royster's Irish Potato Guano.....	6.00	4.12	7.00
Royster's Special	6.00	4.12	5.00
Oakley's Special Tobacco Guano.....	6.00	3.30	4.00
McDowell's Cotton Grower.....	6.00	3.30	2.00
Humphrey's Special for Tobacco.....	6.00	2.55	3.20
Royster's 2-6-5 Special.....	6.00	1.65	5.00
Royster's Special 21 Per Cent Plant Food....	5.50	4.52	10.00
Royster's Special 20 Per Cent Plant Food....	5.00	4.10	10.00
Wiggins' Special	5.50	3.30	3.00
Royster's Cabbage Guano.....	5.00	8.23	2.50
Royster's Special 10 Per Cent Truck Guano..	5.00	8.24	3.00
Harvey's Cabbage Guano.....	5.00	6.59	3.00
Royster's Potato Guano.....	5.00	4.94	7.00
Phillips' Special	5.00	1.65	6.00
Presto Top Dresser.....	4.00	8.22	4.00
Royster's Special Top Dresser.....	4.00	6.18	2.50
Royster's 4-6-4 Special.....	4.00	4.94	4.00
Dried Fish Scrap.....	3.00	9.05	....
Ground Fish Scrap.....	3.00	8.25	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	15.22	.....
Magic Top Dresser.....	7.42	3.00
Sulphate of Potash.....	50.00
Muriate of Potash.....	48.00
Manure Salts.....	20.00
Genuine German Kainit.....	12.00

Robersonville Guano Co., Robersonville, N. C.—

Roberson's H. G. Acid Phosphate.....	16.00
Roberson's H. G. Tobacco Grower.....	8.00	2.47	3.00
Roberson's H. G. Fish and Meal Guano.....	8.00	2.47	3.00
Roberson's H. G. Cotton Grower.....	8.00	2.47	3.00
Roberson's Special 7-7-7 Potato Grower.....	7.00	5.77	7.00
Roberson's H. G. Truck Guano.....	7.00	4.12	5.00
Roberson's 7 Per Cent Potato Guano.....	6.00	5.77	5.00
Roberson Genuine German Kainit.....	.....	.....	12.00
Sulphate of Ammonia.....	.....	20.50	.....
Nitrate of Soda.....	.....	15.60	.....
Dried Blood.....	.....	13.62	.....
Fish Scrap Ground.....	.....	8.00	.....
Muriate of Potash.....	.....	.....	50.00
Sulphate of Potash.....	.....	.....	48.00

Richmond Guano Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	.....
Pure Raw Bone Meal.....Total	22.50	3.70	.....
Rex Dissolved Bone Phosphate.....	16.00	.....	.....
High Grade Acid Phosphate.....	14.00	.....	.....
High Grade Wheat and Grass Fertilizer.....	14.00	.....	.....
Premium Bone and Potash Mixture.....	13.00	.....	3.00
Premium Dissolved Bone.....	13.00	.....	.....
Hunter & Dunn's Dissolved Bone.....	13.00	.....	.....
Premium Corn Special.....	12.00	1.00	2.00
H. G. Bone and Potash Mixture.....	12.00	.....	5.00
Old Homestead Dissolved Bone.....	12.00	.....	.....
Dissolved S. C. Phosphate.....	12.00	.....	.....
Premium Corn Grower.....	10.00	.82	1.00
Bone Mixture.....	10.00	.82	1.00
Rex Bone and Potash Mixture.....	10.00	.....	4.00
Bone and Potash Mixture.....	10.00	.....	2.00
Sanders' Special Formula for Bright Tobacco.....	9.00	2.88	5.00
Hunter & Dunn's Special Ammoniated Fertilizer.....	9.00	2.47	2.25
Collins' Special Fertilizer.....	9.00	2.47	2.00
Carolina Cotton Grower.....	9.00	2.26	2.00
Burton's Special Tobacco Fertilizer.....	9.00	2.06	3.00
Lowery's Special Fertilizer.....	9.00	1.65	3.00
Cracker Jack Fertilizer.....	9.00	1.65	2.00
Bone Mixture.....	9.00	1.65	1.00
Premium Cotton Grower.....	9.00	.82	3.00
Premium Wheat Grower.....	9.00	.82	2.00
Southern Trucker.....	8.00	4.11	5.00
Perfection Special.....	8.00	3.29	4.00
Carolina Bright Tobacco Fertilizer.....	8.00	2.47	3.00
Gilt Edge Fertilizer.....	8.00	2.47	3.00
Carolina Bright Special Tobacco Fertilizer....	8.00	2.26	2.50
Tip Top Fertilizer.....	8.00	2.06	3.00
Carolina Bright for Cotton.....	8.00	2.06	1.50
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Benson's Favorite Fertilizer.....	8.00	1.65	10.00
Benson's Special Fertilizer.....	8.00	1.65	6.00
Rex Tobacco Fertilizer.....	8.00	1.65	4.00
Premium Tobacco Fertilizer.....	8.00	1.65	2.00
Premium Brand Fertilizer.....	8.00	1.65	2.00
Hunter & Dunn's Ammoniated Fertilizer....	8.00	1.65	2.00
Parker & Hunt's Special Tobacco Fertilizer...	8.00	1.65	2.00
Parker & Hunt's Special Fertilizer.....	8.00	1.65	2.00
Edgecombe Cotton Grower.....	8.00	1.65	2.00
Premium Grain Special.....	8.00	.82	4.00
Premium Peanut Special.....	8.00	.82	4.00
Parker & Hunt's Corn Fertilizer.....	8.00	.82	3.00
Premium Peanut Grower.....	8.00	....	4.00
Tip Top Bone and Potash Mixture.....	8.00	....	4.00
Winter Grain and Grass Grower.....	8.00	....	4.00
Clark's Special Formula.....	7.00	4.94	6.00
Special High Grade for Truck.....	7.00	4.94	5.00
10 Per Cent Cabbage Guano.....	6.00	8.23	2.00
Smith's 7 Per Cent Special.....	6.00	5.76	5.00
Edward's Prolific Cotton Grower.....	6.00	3.29	4.00
Carter's Special for Tobacco.....	4.00	2.47	6.00
Smith's Special Fertilizer.....	4.00	1.65	7.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....
Special Top Dresser.....	....	7.30	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Red Cross Guano Co., Lynchburg, Va.—

Pure Raw Bone Meal.....Total	22.00	3.71	....
Red Cross Bone Meal.....Total	22.00	3.00	....
Red Cross H. G. Phosphate.....	16.00	....	....
Red Cross Standard Phosphate.....	14.00	....	....
Red Cross Grain Grower.....	10.00	....	4.00
Red Cross Bone and Potash.....	10.00	....	2.00
Red Cross for Tobacco and Truck.....	9.00	1.85	4.00
Red Cross for Bright Tobacco.....	9.00	1.65	2.00
Red Cross Special for Tobacco.....	8.00	2.47	3.00
Red Cross Tobacco Guano.....	8.00	2.06	3.00
Red Cross Crop Grower.....	8.00	1.65	2.00

Rasin-Monumental Co., Baltimore, Md.—

Rasin 16 Per Cent Acid Phosphate.....	16.00
Rasin 14 Per Cent Acid Phosphate.....	14.00	....	....
Rasin 13 Per Cent Acid Phosphate.....	13.00	....	....
Rasin Special Bone and Potash.....	10.00	....	....
Rasin Bone and Potash.....	10.00	....	2.00
Rasin Dixie Guano.....	9.00	1.65	2.00
Baltimore Special Mixture.....	9.00	.82	2.00
Rasin Gold Standard.....	8.00	2.47	3.00
Rasin's Indian Brand for Tobacco.....	8.00	2.47	3.00
Rasin Empire Guano.....	8.00	1.65	2.00

Read Phosphate Co., Charleston, S. C.—

Read's H. G. Dissolved Bone.....	16.00	....	....
Read's H. G. Acid Phosphate.....	14.00	....	....
Read's Bone and Potash.....	10.00	....	4.00
Read's Alkaline Bone.....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Read's Manipulated Guano.....	9.00	1.65	3.00
Read's Ammoniated Dissolved Bone.....	8.00	3.30	6.00
Read's H. G. Guano.....	8.00	3.30	4.00
Read's H. G. Tobacco Leaf.....	8.00	2.47	3.00
Read's H. G. Cotton Grower.....	8.00	2.47	3.00
Read's Soluble Fish Guano.....	8.00	1.65	2.00
Read's Blood and Bone Fertilizer, No. 1.....	8.00	1.62	2.00
Read's Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	19.00	....
Muriate of Potash.....	....	....	48.00
German Kainit.....	....	....	12.00

Reidsville Fertilizer Co., Reidsville, N. C.—

Reidsville Acid Phosphate.....	16.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Lion Brand Fertilizer.....	9.00	2.47	6.00
Reidsville Hustler.....	9.00	.82	2.00
Farmers Tobacco Fertilizer.....	8.00	3.00	3.00
Royal Fertilizer.....	8.00	2.47	3.00
Climax Fertilizer.....	8.00	2.06	3.00
Farmers Grain Guano.....	8.00	2.00	3.00
Broad Leaf Tobacco Guano.....	8.00	1.85	2.50
Banner Fertilizer.....	8.00	1.65	2.00
Champion Guano.....	8.00	1.65	2.00
Bone and Potash.....	8.00	....	4.00
Muriate of Potash.....	....	....	50.00
German Kainit.....	....	....	12.00

Rowan Chemical Co., Salisbury, N. C.—

Rowan Grain Chemicals.....	20.00	....	12.00
Rowan Tobacco Chemical.....Total	16.00	4.95	6.00
Rowan Tobacco, Cotton and Application Guano.	16.00	4.93	6.00
Rowan 16 Per Cent Acid Phosphate.....	16.00	....	....
Rowan 14 Per Cent Acid Phosphate.....	14.00	....	....
Rowan 13 Per Cent Acid Phosphate.....	13.00	....	....
Rowan Success Guano.....	12.00	3.29	8.00
Rowan Bone and Potash.....	12.00	....	6.00
Rowan Bone and Potash.....	12.00	....	3.00
Rowan 12 Per Cent Acid Phosphate.....	12.00	....	....
Rowan Crop Grower.....	10.00	1.65	2.00
Rowan H. G. Bone and Potash.....	10.00	....	6.00
Rowan Bone and Potash.....	10.00	....	5.00
Rowan Grain Mixture.....	10.00	....	4.00
Rowan Bone and Potash.....	10.00	....	3.00
Rowan Bone and Potash.....	10.00	....	2.00
Rowan Special Tobacco Guano.....	9.00	2.47	3.00
Rowan Fish and Blood Guano.....	9.00	.82	3.00
Rowan Top Dresser.....	8.00	7.44	3.00
Rowan Trucker's Favorite.....	8.00	5.77	5.00
Rowan Strict Middling Guano.....	8.00	3.29	6.00
All Crop Manure.....	8.00	3.29	4.00
Rowan Double Header Guano.....	8.00	2.47	3.00
Rowan Double Header Guano for Tobacco....	8.00	2.47	3.00
Rowan Manipulated Guano.....	8.00	2.47	2.00
Rowan Fish Guano.....	8.00	2.06	3.00
Rowan Fish Guano for Tobacco.....	8.00	2.06	3.00
Rowan Heavy Weight Tobacco Guano.....	8.00	2.06	2.00
Rowan Premium Guano.....	8.00	1.65	10.00
Rowan Special for Cotton and Tobacco.....	8.00	1.65	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Rowan Complete Guano.....	8.00	1.65	3.00
Rowan Bone Guano.....	8.00	1.65	3.00
Rowan Double Quick Guano.....	8.00	1.65	2.00
Rowan Double Quick Guano for Tobacco.....	8.00	1.65	2.00
Rowan Wheat Mixture.....	8.00	....	4.00
Rowan Truck Guano.....	7.00	3.29	5.00
Nitrate of Soda.....	....	14.82	....
Rowan Muriate of Potash.....	....	....	50.00
Rowan Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*Swift Fertilizer Works, Atlanta, Ga., Wilmington,
N. C., and Chester, S. C.—*

Swift's Pure Raw Bone Meal.....Total	23.00	3.71
Swift's Pure Bone Meal.....Total	23.00	2.47	....
Swift's Pure Bone Meal, H. G.....Total	23.00	2.47	....
Swift's Special High Grade Acid Phosphate..	16.00	....	....
Swift's Cultivator High Grade Acid Phosphate.	14.00	....	....
Swift's Harrow Standard Grade Acid Phosphate	13.00	....	....
Swift's Special High Grade Phosphate and Potash	12.00	....	6.00
Swift's Atlanta High Grade Phosphate and Potash	12.00	....	4.00
Swift's Chattahoochee Standard Grade Acid Phosphate	12.00	....	....
Swift's Corn and Cotton Grower H. G. Guano.	10.00	2.47	3.00
Swift's Eagle High Grade Guano.....	10.00	1.65	2.00
Swift's Plow Boy Guano.....	10.00	.82	1.00
Swift's Atlanta H. G. Phosphate and Potash..	10.00	....	5.00
Swift's Farmer's Home High Grade Phosphate and Potash	10.00	....	4.00
Swift's Field and Farm Standard Grade Phosphate and Potash.....	10.00	....	2.00
Swift's Wheat Grower Standard Grade Phosphate and Potash.....	10.00	....	2.00
Swift's Special High Grade Guano.....	9.50	4.12	3.00
Swift's Blood, Bone and Potash High Grade Guano	9.50	3.29	7.00
Swift's Cotton King High Grade Guano.....	9.00	2.47	2.00
Swift's Special Cotton Guano.....	9.00	2.26	2.00
Swift's Gold Medal C. S. M. Compound H. G. Guano	9.00	1.65	3.00
Swift's Farmers' Favorite High Grade Guano.	9.00	1.65	3.00
Swift's Cotton Plant Standard Grade Guano..	9.00	1.65	1.00
Swift's Cape Fear Truck Guano, H. G.....	8.00	4.12	2.00
Swift's Monarch H. G. Guano Vegetable Grower	8.00	3.29	4.00
Swift's Strawberry Grower H. G. Guano.....	8.00	2.47	10.00
Swift's Carolina Tobacco Grower H. G. Guano.	8.00	2.47	3.00
Swift's Ruralist High Grade Guano.....	8.00	2.47	3.00
Swift's Plow Boy C. S. M. Compound H. G. Guano	8.00	2.47	3.00
Swift's Special Blood Guano for Cotton or Tobacco, H. G.....	8.00	2.06	3.00
Swift's Pioneer High Grade Guano Tobacco Grower	8.00	1.65	4.00
Clark's Special Cotton Grower, G. G.....	8.00	1.65	3.00
Swift's Red Steer Standard Grade Guano....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Swift's Golden Harvest Standard Grade Guano	8.00	1.65	2.00
Swift's Special Peanut Grower Standard Grade Guano	8.00	.82	4.00
Swift's Plantation Standard Grade Phosphate and Potash	8.00	....	4.00
Swift's Carolina 7 Per Cent Special Trucker H. G. Guano.....	7.00	5.76	7.00
Swift's Special Irish Potato Grower H. G. Guano	7.00	4.12	8.00
Swift's Early Trucker H. G. Guano.....	7.00	4.12	5.00
High Grade Swift's No. 1 Ground Tankage...	6.00	8.24	....
Swift's Special Trucker H. G. Guano.....	6.00	5.76	5.00
Swift's Favorite Truck Guano H. G.	6.00	4.94	6.00
Swift's Special Potato Grower H. G. Guano..	6.00	4.12	7.00
Swift's Special Tobacco Grower H. G. Guano.	6.00	3.29	6.00
Swift's Special 10 Per Cent Blood and Bone Trucker H. G. Guano.....	5.00	8.23	3.00
Swift's Excelsior Top Dresser H. G. Guano..	4.00	6.18	2.00
Swift's Pure Nitrate of Soda.....	....	14.82	....
Swift's Ground Dried Blood.....	....	13.18	....
Swift's Muriate of Potash.....	....	....	50.00
Swift's Sulphate of Potash.....	....	....	49.00
Swift's Pure German Kainit.....	....	....	12.00

Southern Chemical Co., Inc., Roanoke, Va.—

Pride of Virginia.....	8.00	2.47	3.00
Valley Queen	8.00	1.65	10.00
Farmers' Joy	8.00	1.65	4.00
Our Favorite	8.00	1.65	2.00

Spartanburg Fertilizer Co., Spartanburg, S. C.—

Tiger Brand Acidulated Phosphate.....	14.00	....	....
West's Potash Acid.....	13.00	....	3.00
Gosnell's Plant Food.....	10.50	2.46	2.00
N. C. Special.....	10.50	1.65	8.00
Corn Formula	10.50	1.65	5.00
Dana's Best	10.00	....	4.00
Melrose	10.00	....	2.00
Boll Buster	9.00	1.65	2.00
Glencoe	8.00	2.46	3.00
Cotton Compound	8.75	1.65	2.00
Potato Guano	7.00	2.46	7.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	48.00

Scotland Neck Guano Co., Scotland Neck, N. C.—

Our 16 Per Cent Acid Phosphate.....	16.00	....	....
Our 14 Per Cent Acid Phosphate.....	14.00	....	....
Our Bone and Potash Mixture.....	10.00	....	4.00
Noah Biggs' Truck Guano.....	9.00	4.10	5.00
Biggs' Cotton-seed Meal Fish Scrap Guano....	9.00	3.30	4.00
Josey's Cotton-seed Meal and Fish Scrap To- bacco Guano	9.00	2.47	3.00
Old Halifax Cotton-seed Meal and Fish Scrap Tobacco Guano	9.00	2.47	3.00
Our Cotton Growers C. S. M. and Fish Scrap Guano	9.00	2.05	2.50
Our Favorite Cotton-seed Meal Guano.....	9.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Our Bright Tobacco Guano.....	8.00	2.47	3.00
Our Best Peanut Guano.....	5.50	1.23	5.50
K. Elite Top Dressing.....	3.00	7.40	3.50
Nitrate of Soda.....	....	15.50	....
Sulphate of Potash.....	....	....	48.00
Muriate of Potash.....	....	....	48.00
Our Genuine German Kainit.....	....	....	12.00

The Southern Exchange Co., Marton, N. C.—

S. E. C. Acid Phosphate.....	16.00	....	....
S. E. C. Acid Phosphate.....	14.00	....	....
S. E. C. Potash Mixture.....	10.00	....	4.00
S. E. C. Bone and Potash Mixture.....	10.00	....	2.00
Juicy Fruit Fertilizer.....	9.00	1.85	4.00
The Walnut Fertilizer.....	8.50	2.06	2.50
Melon Grower.....	8.00	4.11	7.00
McKinnon's Special Truck Formula.....	8.00	4.11	7.00
Two Fours Guano.....	8.00	3.29	4.00
Southern Exchange Co.'s Bright Tobacco For- mula.....	8.00	2.47	4.00
That Big Stick Guano.....	8.00	2.47	4.00
Bull of the Woods Fertilizer.....	8.00	2.47	4.00
Jack's Best Fertilizer.....	8.00	2.47	3.00
Correct Cotton Compound.....	8.00	2.47	3.00
R. M. C. Special Crop Grower.....	8.00	2.47	3.00
Southern Exchange Co.'s Special Tobacco Fer- tilizer.....	8.00	1.65	3.00
Currie's Crop Lifter.....	8.00	1.65	3.00
The Racer Guano.....	8.00	1.65	3.00
The Coon Guano.....	8.00	1.65	2.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	12.00

Southern Cotton Oil Co., Charleston, S. C.—

Pioneer.....	7.00	3.62	5.00
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Smith, Ham & Co., Pikeville, N. C.—

Genuine German Kainit.....	12.00
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H. T. Shannonhouse, Hertford, N. C.—

H. T. Shannonhouse 16 Per Cent Acid Phos- phate.....	16.00
H. T. Shannonhouse 14 Per Cent Acid Phos- phate.....	14.00	....	....
Shannonhouse Bone and Potash.....	10.00	....	4.00
H. T. S. Full Value.....	8.00	3.29	4.00
Pride of Carolina.....	8.00	3.29	4.00
H. T. S. Favorite.....	8.00	3.29	4.00
Farmers' Tobacco Favorite.....	8.00	2.47	3.00
Nun Better.....	8.00	2.47	3.00
Shannonhouse Blood and Bone.....	8.00	2.47	3.00
Southern Pride.....	8.00	2.47	3.00
Carolina's Choice.....	8.00	2.47	3.00
Sunny South.....	8.00	2.47	3.00
H. T. S. Tobacco Grower.....	8.00	1.65	2.00
Shannonhouse Success.....	8.00	1.65	2.00
Square Deal.....	8.00	1.65	2.00
X. L. M. for Cotton and Corn.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Farmers' Money Maker.....	8.00	1.65	2.00
P. D. Q. Truck Grower.....	6.00	4.11	5.00
Shannonhouse High Grade.....	6.00	4.11	5.00
Genuine German Kainit.....	....	....	12.00

*The Southern Cotton Oil Co., Charlotte District,
Concord, Charlotte, Davidson, Shelby, Gib-
son, Monroe and Wadesboro—*

Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	16.00	....	....
Gold Seal	14.00	....	....
Silver King	13.00	....	....
Conqueror Bone and Potash.....	10.00	....	4.00
Magnolia Bone and Potash.....	10.00	....	2.00
Uncle Sam	9.00	2.47	3.00
Home Made	9.00	2.05	3.00
Razem	9.00	1.65	3.00
King Bee	8.83	1.65	2.00
Choice	8.00	3.30	6.00
Conqueror	8.00	3.30	4.00
Canto	8.00	3.29	6.00
Melonite	8.00	3.29	4.00
Peacock	8.00	2.47	3.00
Moon	8.00	2.47	3.00
Landsake	8.00	2.47	2.50
Red Bull	8.00	2.06	2.00
All-to-Good	8.00	2.05	3.00
Gloria	8.00	1.65	2.00
Double Two	8.00	1.65	2.00
Dandy Top Dresser.....	4.00	9.07	2.50
Nitrate of Soda.....	....	15.00	....
Nitrate of Soda.....	....	13.20	....
Labi .....	....	8.99	17.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*Southern Cotton Oil Co., Goldsboro, Fayetteville,
Rocky Mount and Wilson—*

Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	16.00	....	....
Southern Cotton Oil Co.'s 14 Per Cent Acid Phosphate	14.00	....	....
Best & Thompson's Special Cotton Grower....	9.00	2.27	2.00
Goldsboro Cotton Grower.....	9.00	2.27	2.00
Goldsboro Oil Mill Special Mixture.....	8.00	3.30	4.00
Fayetteville Oil Mill Special Mixture.....	8.00	3.30	4.00
Wilson Oil Mill Special Mixture.....	8.00	3.30	4.00
Rocky Mount Oil Mill Special Mixture.....	8.00	3.30	4.00
Southern Cotton Oil Co.'s Special Mixture....	8.00	3.30	4.00
Southern Cotton Oil Co.'s Melon Grower.....	8.00	2.47	10.00
Southern Cotton Oil Co.'s Special Cotton Grower	8.00	2.47	3.00
Best & Thompson's High Grade.....	8.00	2.47	3.00
Goldsboro Oil Mill Special Cotton Grower....	8.00	2.47	3.00
Fayetteville Oil Mill Special Cotton Grower..	8.00	2.47	3.00
Wilson Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Rocky Mount Oil Mill Special Cotton Grower..	8.00	2.47	3.00
B. G. Thompson's Special Cotton and Tobacco Guano	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Edgerton's Old Reliable.....	8.00	2.47	3.00
Morning Glory	8.00	2.47	3.00
Goldsboro Oil Mill High Grade.....	8.00	2.27	2.50
Fayetteville Oil Mill High Grade.....	8.00	2.27	2.50
Wilson Oil Mill High Grade.....	8.00	2.27	2.50
The Southern Cotton Oil Co. High Grade.....	8.00	2.27	2.50
Southern Cotton Oil Co.'s Peanut Grower....	8.00	1.65	4.00
Goldsboro Oil Mill Standard.....	8.00	1.65	2.00
Fayetteville Oil Mill Standard.....	8.00	1.65	2.00
Wilson Oil Mill Standard.....	8.00	1.65	2.00
Rocky Mount Oil Mill Standard.....	8.00	1.65	2.00
The Southern Cotton Oil Co. Standard.....	8.00	1.65	2.00
Southern Cotton Oil Co. Truck Grower.....	6.00	4.12	7.00

Tidewater Guano Co., Norfolk, Va.—

Tidewater Raw Bone Meal.....Total	21.00	3.71
Top Rail Acid Phosphate.....	16.00	....	....
Buster Brown Acid Phosphate.....	14.00	....	....
Bully Boy Dissolved Bone and Potash.....	10.00	....	2.00
Diana Brand Bone and Potash Compound....	10.00	....	4.00
High Tide Soluble Guano.....	8.00	3.30	4.00
Sho Nuf Guano, H. G.....	8.00	2.47	3.00
Hawk Eye Soluble Guano.....	8.00	2.07	2.00
Soil King Special Guano.....	8.00	1.85	4.00
Double Action Soluble Guano.....	8.00	1.65	2.00
"Good Money" Complete Guano.....	8.00	1.00	4.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Fish .....	....	9.04	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Tuscarora Fertilizer Co., Atlanta, Ga., and Wilmington, N. C.—

Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....
Tuscarora Alkaline Bone.....	10.00	....	5.00
Tuscarora Acid and Potash.....	10.00	....	4.00
Tuscarora Bone and Potash.....	10.00	....	2.00
Tuscarora Chief	9.00	1.65	3.00
Tuscarora Trucker	8.00	4.11	7.00
Fertilizer No. 844.....	8.00	3.30	4.00
Tobacco Special	8.00	2.47	3.00
Cotton Special	8.00	2.47	3.00
Berry King	8.00	2.05	4.00
King Cotton	8.00	2.05	2.00
Tuscarora Champion	8.00	2.05	2.50
Tuscarora Champion Tobacco Grower.....	8.00	2.05	2.50
Tuscarora Fruit and Potato.....	8.00	1.65	10.00
Tuscarora Fertilizer No. 8-2-5.....	8.00	1.65	5.00
Tuscarora Standard	8.00	1.65	2.00
Tuscarora Standard Tobacco Grower.....	8.00	1.65	2.00
Tuscarora Bone and Potash.....	8.00	....	4.00
Big Four (4) Fertilizer.....	7.00	1.65	4.00
Manure Substitute	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
<i>Union Guano Co., Winston-Salem, N. C.-</i>			
Pure Raw Animal Bone Meal.....Total	22.50	3.71	....
Pure Animal Bone Meal.....Total	22.50	2.47	....
Union 16 Per Cent Acid Phosphate.....	16.00	....	....
Union High Grade Acid Phosphate.....	14.00	....	....
Union Dissolved Animal Bone.....Total	13.00	2.06	....
Union Dissolved Bone.....	13.00	....	....
Union 12-6 Bone and Potash.....	12.00	....	6.00
Union 12-5 Bone and Potash.....	12.00	....	5.00
Union 12-4 Bone and Potash.....	12.00	....	4.00
Union 12-3 Bone and Potash.....	12.00	....	3.00
Union 12-2 Bone and Potash.....	12.00	....	2.00
Union 12 Per Cent Acid Phosphate.....	12.00	....	....
Liberty Bell Crop Grower.....	10.50	....	1.50
Union Prolific Cotton Compound.....	10.00	3.29	4.00
Union Special Formula for Cotton.....	10.00	2.47	3.00
Union Mule Brand Guano.....	10.00	1.65	2.00
Union 10-6 Bone and Potash.....	10.00	....	6.00
Union 10-5 Bone and Potash.....	10.00	....	5.00
Union 10-4 Bone and Potash.....	10.00	....	4.00
Quakers' Grain Mixture.....	10.00	....	4.00
Giant Phosphate and Potash.....	10.00	....	3.00
Finch & Harris' Special Bone and Potash Mixture	10.00	....	3.00
Union Bone and Potash.....	10.00	....	2.00
Union Renown Guano.....	9.00	2.47	3.00
Union Perfect Cotton Grower.....	9.00	2.26	2.00
Union Complete Cotton Mixture.....	9.00	1.65	3.00
Farmers' Blood and Bone Guano.....	9.00	1.65	3.00
Dixie Cotton Grower	9.00	1.65	2.00
Q. and Q. (Quality and Quantity) Guano....	9.00	1.65	1.00
"B. S." Ammoniated Guano.....	9.00	.82	3.00
Union Approved Crop Grower.....	8.75	1.65	2.00
Union Guano for Cotton and Tobacco.....	8.00	3.29	6.00
Union Premium Guano.....	8.00	3.29	4.00
Union Homestead Guano.....	8.00	2.47	3.00
Victoria High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Union Water Fowl Guano.....	8.00	2.06	3.00
Union Standard Tobacco Grower.....	8.00	2.06	2.00
Union Potato Mixture	8.00	1.65	10.00
Christian's Special Tobacco Grower.....	8.00	1.65	3.00
Old Honesty Guano	8.00	1.65	2.00
Old Honesty Tobacco Guano.....	8.00	1.65	2.00
Fish Brand Ammoniated Guano.....	8.00	1.65	2.00
Union Superlative Guano.....	8.00	.82	4.00
Sunrise Ammoniated Guano.....	8.00	.82	3.00
Union 8-5 Bone and Potash.....	8.00	....	5.00
Union Wheat Mixture.....	8.00	....	4.00
Union Vegetable Compound.....	7.00	4.12	8.00
Union Truck Guano	7.00	3.29	5.00
Nitrate of Soda.....	....	14.83	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>United States Fertilizer Co., Baltimore, Md.—</i>			
Farm Bell Acid Phosphate.....	16.00	....	....
Farm Bell Acid Phosphate.....	14.00	....	....
Farm Bell Phospho. Potassa.....	12.00	....	5.00
Farm Bell Potash and Acid.....	10.00	....	6.00
Farm Bell Special Mixture.....	10.00	....	4.00
Farm Bell Alkaline Mixture.....	10.00	....	2.00
Farm Bell Big Yield.....	9.00	2.47	4.00
Farm Bell Buckeye Guano.....	9.00	.82	2.00
Farm Bell Majestic Guano.....	8.00	3.28	4.00
Farm Bell Cotton Special.....	8.00	2.47	3.00
Farm Bell Tobacco Special.....	8.00	2.47	3.00
Farm Bell Crop Grower.....	8.00	2.06	3.00
Farm Bell Fruit and Potato.....	8.00	1.65	10.00
Farm Bell Animal Ammoniated.....	8.00	1.65	5.00
Farm Bell Standard Guano.....	8.00	1.65	2.00
Farm Bell Pennant Winner.....	8.00	.82	4.00
Farm Bell Phosphate and Potash.....	8.00	....	5.00
Farm Bell Trucker's Ideal.....	7.00	4.11	8.00
Farm Bell Potato and Tobacco Guano.....	7.00	2.47	10.00
Farm Bell 7 Per Cent Trucker.....	6.00	5.75	5.00
Farm Bell Trucker's Favorite.....	6.00	3.28	8.00

Union Abattoir Co., Baltimore, Md., and Richmond, Va.—

Pure Bone and Potash Compound.....	16.00	1.65	2.50
Red Star Acid Phosphate.....	16.00	....	....
Red Star Acid Phosphate.....	14.00	....	....
Pure Dissolved Animal Bone.....	12.00	1.65	....
Red Star Potash and Soluble Bone.....	12.00	....	5.00
Potash and Soluble Bone (Red Star).....	12.00	....	3.00
Red Star Potash and Soluble Bone.....	10.00	....	5.00
Red Star Potash and Soluble Bone.....	10.00	....	2.00
Red Star Brand Tobacco Compound.....	9.00	3.27	2.00
Red Star Brand Cotton Guano.....	8.00	3.28	4.00
Red Star Early Truck and Tobacco Guano...	8.00	3.28	4.00
Red Star Cotton and Tobacco Guano.....	8.00	2.46	3.00
Red Star Tobacco Fertilizer.....	8.00	2.05	2.00
Red Star Cotton Guano.....	8.00	1.65	2.00
Red Star Standard.....	8.00	1.65	2.00
Red Star Grain and Grass.....	8.00	1.00	4.00
Red Star Peanut Grower.....	8.00	1.00	4.00
Red Star Potato Manure.....	7.00	2.46	10.00
Red Star Special Guano.....	7.00	2.46	5.00
Red Star 7 Per Cent Guano.....	6.00	5.74	5.00
Early Truck and Potato Guano.....	6.00	4.10	7.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	48.00
German Kainit.....	....	....	12.00

R. L. Upshur, Norfolk, Va.—

Upshur's 16 Per Cent Acid Phosphate.....	16.00	....	....
Upshur's High Grade Acid Phosphate.....	14.00	....	....
Upshur's Wheat Compound.....	12.00	....	5.00
Upshur's Bone and Potash Guano.....	10.00	....	2.00
Cotton-seed Meal Mixture.....	9.00	2.26	2.00
Upshur's O. P. (Old Plantation).....	9.00	1.65	2.00
Upshur's 8-3-3 Cotton.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Upshur's High Grade Tobacco Guano.....	8.00	2.47	3.00
Upshur's Special 2½-8-3.....	8.00	2.05	3.00
Upshur's F. F. V. (Favorite Fertilizer of Virginia)	8.00	1.65	2.00
Upshur's Peanut Guano	8.00	1.65	2.00
Upshur's G., G. & C. Guano.....	8.00	1.65	2.00
Premo Cotton Guano.....	8.00	1.65	2.00
Upshur's Fish, Bone and Potash.....	8.00	1.64	4.00
Upshur's Special Truck Guano.....	7.00	4.11	8.00
Upshur's F. F. (Farmers' Favorite).....	7.00	4.11	6.00
Upshur's New Process Guano.....	6.00	6.58	8.00
Upshur's F. C. (Farmers' Challenge).....	6.00	5.76	6.00
Upshur's 7 Per Cent Irish Potato Guano.....	6.00	5.76	5.00
Upshur's 4-6-4 Tobacco Special.....	6.00	3.69	4.00
Upshur's Norfolk Special 10 Per Cent.....	5.00	8.23	2.00
Upshur's Special Potato Guano.....	5.00	5.76	5.00
Upshur's 5 Per Cent.....	5.00	4.11	5.00
Nitrate of Soda.....	....	15.22	....
Ground Fish .....	....	9.04	....
Ground Tankage .....	....	6.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Venable Fertilizer Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone.....Total	22.50	3.70	....
Venable's Best Acid Phosphate.....	16.00	....	....
H. G. Acid Phosphate.....	14.00	....	....
Venable's Dissolved Bone.....	13.00	....	....
Venable's Standard Acid Phosphate.....	12.00	....	....
Venable's Corn, Wheat and Grass Fertilizer..	10.00	.82	1.00
High Grade Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Roanoke Mixture	9.00	2.26	2.00
Roanoke Meal Mixture	9.00	2.26	2.00
Venable's B. B. P. Manure.....	9.00	1.65	1.00
Venable's 5 Per Cent Trucker.....	8.00	4.11	5.00
Venable's 4 Per Cent Trucker.....	8.00	3.29	4.00
Venable's H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Ballard's Choice Fertilizer.....	8.00	2.47	3.00
Venable's Alliance Tobacco Manure, No. 1....	8.00	2.06	3.00
Venable's Cotton Grower.....	8.00	2.06	3.00
Venable's Roanoke Special	8.00	2.06	3.00
Venable's Ideal Manure.....	8.00	1.65	5.00
Our Union Tobacco Fertilizer.....	8.00	1.65	4.00
Venable's Meal Mixture.....	8.00	1.65	2.00
Venable's Alliance Tobacco Manure, No. 2....	8.00	1.65	2.00
Venable's Meal Mixture.....	8.00	1.65	2.00
Our Union Special Fertilizer.....	8.00	1.65	2.00
Planters' Bone Fertilizer.....	8.00	1.65	2.00
Venable's Peanut Special.....	8.00	.82	4.00
Venable's Alliance Bone and Potash Mixture.	8.00	....	4.00
Venable's Peanut Grower	8.00	....	4.00
Venable's 10 Per Cent Trucker.....	6.00	8.23	2.00
Venable's 6-6-6 Manure.....	6.00	4.94	6.00
Nitrate of Soda.....	....	15.63	....
Special Top Dresser.....	....	7.30	3.00
Muriate of Potash.....	....	....	50.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00
<i>Vance Guano Co., Henderson, N. C.—</i>			
Vance Corn and Grain Grower.....	10.00	1.00	3.50
"Farmers' Union" Highest Grade Fertilizer..	9.00	3.00	3.00
Brodie's Best	8.00	4.00	4.00
Fish Brand Guano for Tobacco.....	8.00	3.00	3.00
Sterling Cotton Grower	8.00	2.00	2.00
Hot-Stuff for Cotton.....	8.00	2.00	2.00
Vance Top Dresser.....	3.00	10.00	5.00
<i>Virginia-Carolina Chemical Co., Richmond, Va.—</i>			
V.-C. C. Co.'s 17 Per Cent Acid Phosphate....	17.00	....	....
V.-C. C. Co.'s 16 Per Cent Acid Phosphate....	16.00	....	....
V.-C. C. Co.'s 14 Per Cent Acid Phosphate....	14.00	....	....
V.-C. C. Co.'s Special High Grade Potash Mix- ture	12.00	....	6.00
V.-C. C. Co.'s H. G. Potash Mixture.....	12.00	....	5.00
V.-C. C. Co.'s 12-4 Grain Grower.....	12.00	....	4.00
V.-C. C. Co.'s Special Crop Grower.....	12.00	....	3.00
V.-C. C. Co.'s Grain Special.....	10.00	....	6.00
V.-C. C. Co.'s Standard Bone and Potash....	10.00	....	5.00
V.-C. C. Co.'s Special Potash Mixture.....	10.00	....	4.00
V.-C. C. Co.'s Dissolved Bone and Potash....	10.00	....	2.00
V.-C. C. Co.'s Cotton Grower.....	9.00	2.26	2.00
V.-C. C. Co.'s Farmers' Choice.....	8.00	3.29	4.00
V.-C. C. Co.'s Special.....	8.00	3.29	4.00
V.-C. C. Co.'s High Grade Tobacco Fertilizer..	8.00	2.47	10.00
V.-C. C. Co.'s Monarch Brand.....	8.00	1.65	5.00
V.-C. C. Co.'s Corn and Peanut Special.....	8.00	1.65	2.00
V.-C. C. Co.'s Special Peanut Grower.....	8.00	1.00	4.00
V.-C. C. Co.'s Peanut Grower.....	8.00	.82	4.00
V.-C. C. Co.'s Potash Mixture for Peanuts....	8.00	....	4.00
V.-C. C. Co.'s Truck Crop Fertilizer.....	7.00	4.12	7.00
V.-C. C. Co.'s Potash Potato Producer.....	7.00	3.29	8.00
V.-C. C. Co.'s Formula 44 for Bright Wrappers and Smokers	7.00	2.55	3.30
V.-C. C. Co.'s Special Truck Guano.....	6.00	4.12	7.00
V.-C. C. Co.'s High Grade Top Dresser.....	4.00	6.17	2.50
V.-C. C. Co.'s 10 Per Cent Top Dresser Extra H. G.	4.00	8.24	4.00
Johnston's Best	20.00	4.94	6.00
Sludge Acid Phosphate.....	14.00	....	....
Goodman's Special Potash Mixture.....	12.00	....	5.00
Battle's Crop Grower.....	12.00	....	3.00
Home Comfort Acid Phosphate.....	12.00	....	....
Virginia 11-5 Bone and Potash.....	11.00	....	5.00
Sovereign Crop Producer.....	10.00	1.65	2.00
Ford's Wheat and Corn Guano.....	10.00	.82	2.50
Great Texas Cotton Grower Soluble Guano...	9.00	2.47	4.00
Jeffrey's High Grade Guano.....	9.00	2.47	3.00
Southern Cotton Grower.....	9.00	2.29	2.00
Best's Special Cotton Grower.....	9.00	2.26	2.00
Best's H. G. Cotton and Tobacco Grower....	8.00	2.47	3.00
Powell's Special H. G. C. S. M.....	9.00	2.26	3.00
Prolific Cotton Grower.....	9.00	2.26	2.00
White Stem C. S. M.	9.00	2.26	2.00
Bumper Crop Guano	9.00	2.06	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Cock's Soluble Guano High Grade Animal			
Bone	9.00	1.85	3.00
Reliable Cotton Brand Fertilizer.....	9.00	1.65	3.00
North State Guano C. S. M.....	9.00	1.65	1.00
Bigelow's Crop Guano.....	9.00	.82	3.00
Burnhardt's Grain and Crop Guano.....	9.00	.82	3.00
McCormick's Wheat and Grain Guano.....	9.00	.82	3.00
Farmers' Friend Favorite Fertilizer Special..	8.50	1.65	2.00
Farmers' Success	8.00	2.47	4.00
Powhatan Crop Mixture.....	8.50	1.65	1.50
Pelican Peruvian Guano (1,000 pounds Genn- ine Peruvian Guano to the ton).....	8.00	4.12	5.00
Carr's 8-4-4 Crop Grower.....	8.00	3.29	4.00
Jumbo Peruvian Guano (1,000 pounds Genuine Peruvian Guano to the ton).....	8.00	2.47	3.00
Lion's High Grade Tobacco Fertilizer.....	8.00	2.47	4.00
Oldham's Special Compound for Tobacco, High Grade	8.00	2.47	3.00
Blake's Best	8.00	2.47	3.00
Royal High Grade Fertilizer.....	8.00	2.47	3.00
Special High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Adams' Special	8.00	2.47	3.00
Peruvian H. G. Tobacco Guano.....	8.00	2.47	3.00
Red Chief H. G. Cotton Grower.....	8.00	2.47	3.00
Zeno Special Compound for Tobacco, H. G....	8.00	2.47	3.00
Gold Medal H. G. Tobacco Guano.....	8.00	2.47	3.00
Atlas Guano C. S. M.....	8.00	2.47	2.50
John F. Croom & Bro. Fish and Meal Mixture.	8.00	3.29	4.00
Pace's 5 Per Cent Special Potato Guano.....	8.00	1.65	5.00
The Harvester	8.00	.82	3.00
Pinical Grain Grower	8.00	.82	3.00
Pure Animal Bone Meal.....Total	23.00	2.47	....
Pure Raw Bone Meal.....Total	21.50	3.71	....
Dissolved Animal Bone.....	13.00	2.06	....
Admiral	8.00	2.47	2.50
Good Luck C. S. M.....	8.00	2.47	2.50
Split Silk C. S. M.....	8.00	2.47	2.50
Myatt's Special High Grade Fertilizer.....	8.00	2.47	3.00
Orange Grove Guano.....	8.00	2.26	2.50
Delta C. S. M.....	8.00	2.26	2.50
Royal Crown	8.00	2.26	2.00
Blue Star C. S. M.....	8.00	2.06	3.00
Superlative C. S. M. Guano.....	8.00	2.06	3.00
Smith's Irish Potato Guano.....	8.00	1.65	10.00
Parker & Hunter's Special.....	8.00	1.65	4.00
Winston Special for Cotton C. S. M.....	8.00	1.65	2.00
Diamond Dust C. S. M.....	8.00	1.65	2.00
Plant Food C. S. M.....	8.00	1.65	2.00
Wilson's Standard C. S. M.....	8.00	1.65	2.00
Ajax C. S. M. Guano.....	8.00	1.65	2.00
Farmers' Favorite Fertilizer C. S. M.....	8.00	1.65	2.00
Jones' Grain Special.....	8.00	....	4.00
Konqueror H. G. Truck Fertilizer.....	7.00	4.12	5.00
Pasquotank Trucker	7.00	3.29	8.00
Invincible High Grade Fertilizer.....	6.00	4.12	7.00
Dewberry's Special	4.00	6.59	....
Sulphate of Ammonia .....	....	20.59	....
Sulphate of Potash.....	....	....	48.00
Nitrate of Soda.....	....	14.82	....
Fish Scrap .....	....	8.24	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Muriate of Potash.....	....	....	49.00
Manure Salts .....	....	....	20.00
Genuine German Kainit.....	....	....	12.00
Allison & Addison's Fulton Acid Phosphate...	14.00	....	....
Allison & Addison's I. X. L. Acid Phosphate...	13.00	....	....
Allison & Addison's Standard Acid Phosphate...	12.00	....	....
Allison & Addison's Rocket Acid Phosphate...	12.00	....	....
Allison & Addison's B. P. Potash Mixture....	10.00	....	2.00
Allison & Addison's McGavock's Special Potash Mixture	10.00	....	2.00
Allison & Addison's Star Special Tobacco Manure	9.00	2.26	2.00
Allison & Addison's Star Brand Special H. G.	9.00	2.06	5.00
Allison & Addison's Star Brand Guano.....	9.00	1.65	1.00
Allison & Addison's Little Giant Grain and Grass Grower	9.00	.82	2.00
Allison & Addison's Anchor Brand Tobacco Fertilizer	8.50	2.26	2.00
Allison & Addison's Star Vegetable Brand Guano	8.00	3.70	4.00
Allison & Addison's A. A. Guano.....	8.00	2.47	3.00
Allison & Addison's Anchor Brand Fertilizer..	8.00	1.65	2.00
Allison & Addison's Old Hickory Guano.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Acid Phosphate	16.00	....	....
Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Phosphate	14.00	....	....
Atlantic and Virginia Fertilizer Co.'s Crenshaw Acid Phosphate.....	13.00	....	....
Atlantic and Virginia Fertilizer Co.'s Our Acid Phosphate	12.00	....	....
Nowell's Special	8.00	3.29	4.00
N. and R.'s Best.....	9.00	2.47	3.00
V.-C. C. Co.'s Veeco Cotton Grower.....	9.00	2.26	2.00
3 Per Cent Special C. S. M. Guano, No. 3.....	8.00	2.47	2.00
Diamond C. S. M. Guano.....	8.00	2.47	3.00
Atlantic and Virginia Fertilizer Co.'s Eureka Bone and Potash Compound.....	10.00	....	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9.00	2.06	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Complete Manure	9.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Virginia Truckers	8.00	4.12	5.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Special for Tobacco.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Carolina Truckers	7.00	5.76	7.00
Charlotte Oil and Fertilizer Co.'s 15 Per Cent Acid Phosphate	15.00	....	....
Charlotte Oil and Fertilizer Co.'s Catawba Bone Phosphate	14.00	....	....
Charlotte Oil and Fertilizer Co.'s Charlotte Acid Phosphate	13.00	....	....
Charlotte Oil and Fertilizer Co.'s Dayvault's Special	12.00	....	6.00
Charlotte Oil and Fertilizer Co.'s Charlotte Dissolved Bone	12.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Charlotte Oil and Fertilizer Co.'s Oliver's Perfect Wheat Grower.....	11.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s 10-2 Bone and Potash	10.00	....	2.00
Charlotte Oil and Fertilizer Co.'s High Grade Special Tobacco Fertilizer.....	9.00	2.06	2.00
Charlotte Oil and Fertilizer Co.'s Queen of the Harvest C. S. M.....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s McCrary's Diamond Bone and Potash.....	9.00	....	3.00
Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fertilizer.....	8.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s Catawba Guano B. G.....	8.00	2.47	3.00
Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano C. S. M.....	8.00	2.47	2.00
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano B. G.....	8.00	2.06	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano C. S. M.....	8.00	2.06	1.50
The Leader B. G.....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s King Cotton Grower	8.00	1.65	2.00
Davie & Whittle's Owl Brand High Grade Acid Phosphate	16.00	....	....
Davie & Whittle's Owl Brand High Grade Dissolved Bone	14.00	....	....
Davie & Whittle's Owl Brand Acid Phosphate.	13.00	....	....
Davie & Whittle's Owl Brand Dissolved Bone.	12.00	....	....
Davie & Whittle's Owl Brand Acid Phosphate with Potash	10.00	....	2.00
Davie & Whittle's Owl Brand High Grade 3 Per Cent Soluble Guano.....	9.00	2.06	3.00
Davie & Whittle's Owl Brand Special Tobacco Guano	9.00	2.06	2.00
Davie & Whittle's Owl Brand Truck Guano..	8.00	4.94	5.00
Davie & Whittle's Owl Brand Guano for Tobacco	8.00	2.47	3.00
Davie & Whittle's Vinco Guano.....	8.00	1.65	3.00
Davie & Whittle's Owl Brand Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Durham Best Acid Phosphate	16.00	....	....
Durham Fertilizer Co.'s Standard High Grade Acid Phosphate	14.00	....	....
Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate	14.00	....	....
Durham Fertilizer Co.'s Blacksburg Dissolved Bone	13.00	....	....
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Acid Phosphate.....	13.00	....	....
Durham Fertilizer Co.'s Double Bone Phosphate	13.00	....	....
Durham Fertilizer Co.'s Durham Acid Phosphate	12.00	....	....
Durham Fertilizer Co.'s Great Wheat Grower.	10.50	....	1.50
Durham Fertilizer Co.'s Diamond Wheat Mixture	10.00	....	3.00
Durham Fertilizer Co.'s Standard Wheat and Corn Grower	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Durham Fertilizer Co.'s Blue Ridge Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Standard Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Durham Bone and Potash Mixture	10.00	....	2.00
Durham Fertilizer Co.'s L. & N. Special.....	9.00	2.47	2.00
Durham Fertilizer Co.'s Standard Guano....	9.00	1.65	2.00
Durham Fertilizer Co.'s Durham Ammoniated Fertilizer	9.00	1.65	1.00
Durham Fertilizer Co.'s Special Plant and Truck Fertilizer	8.00	4.12	3.00
Durham Fertilizer Co.'s Durham High Grade.	8.00	3.29	4.00
Durham Fertilizer Co.'s Gold Medal Brand Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s Yellow Leaf Tobacco Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s N. C. Farmers' Alli- ance Official Guano.....	8.00	2.06	3.00
Durham Fertilizer Co.'s Pride of Durham To- bacco Grower	8.00	2.06	3.00
Durham Fertilizer Co.'s Raw Bone Superphos- phate for Tobacco.....	8.00	2.06	2.00
Durham Fertilizer Co.'s Raw Bone Superphos- phate.....	8.00	2.06	1.50
Durham Fertilizer Co.'s Genuine Bone and Pe- ruvian Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Progressive Farmer Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Carr's Special Wheat Grower	8.00	....	4.00
Durham Fertilizer Co.'s Best Potato Manure.	7.00	5.76	7.00
Lynchburg Guano Co.'s Ironside Acid Phos- phate	16.00	....	....
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate.....	14.00	....	....
Lynchburg Guano Co.'s Arvonja Acid Phos- phate	13.00	....	....
Lynchburg Guano Co.'s Spartan Acid Phos- phate	12.00	....	....
Lynchburg Guano Co.'s Alpine Mixture.....	10.00	....	5.00
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture.....	10.00	....	4.00
Lynchburg Guano Co.'s Dissolved Bone and Potash	10.00	....	2.00
Lynchburg Guano Co.'s Independent Standard.	8.50	1.65	2.00
Lynchburg Guano Co.'s Bright Belt Guano...	8.00	2.47	3.00
Lynchburg Guano Co.'s Solid Gold Tobacco...	8.00	2.26	4.00
Lynchburg Guano Co.'s New Era.....	8.00	1.65	3.00
Lynchburg Guano Co.'s Lynchburg Soluble...	8.00	1.65	2.00
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Reliable Acid Phosphate.....	14.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Best Acid Phosphate.....	13.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Norfolk and Carolina Chemical Co.'s Norfolk Soluble Bone	12.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Bone and Potash.....	10.00	....	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Trucker and Tomato Grower.....	8.00	4.12	5.00
Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Amazon H. G. Special Tobacco Guano.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Cooper's Bright Tobacco Fertilizer.....	8.00	2.06	3.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Made Especially for Tobacco	8.00	2.06	2.00
Norfolk and Carolina Chemical Co.'s Peanut Grower	8.00	1.00	4.00
Norfolk and Carolina Chemical Co.'s Crescent Brand Ammoniated Fertilizer	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s High Grade Acid Phosphate	14.00	....	....
Old Dominion Guano Co.'s Bone Phosphate...	13.00	....	....
Old Dominion Guano Co.'s Royster's Acid Phosphate	12.00	....	....
Old Dominion Guano Co.'s Obelisk Brand Bone and Potash.....	10.00	....	4.00
Old Dominion Guano Co.'s Planter's Bone and Potash Mixture.....	10.00	....	3.00
Old Dominion Guano Co.'s Old Dominion Alkaline Bone and Potash.....	10.00	....	2.00
Old Dominion Guano Co.'s Horne's Cotton Fertilizer	9.00	2.06	3.00
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano	9.00	1.65	1.00
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer.....	8.00	2.47	3.00
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer.....	8.00	2.47	3.00
Old Dominion Guano Co.'s Osceola Tobacco Guano	8.00	2.06	3.00
Old Dominion Guano Co.'s Farmers' Friend Fertilizer	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Guano	8.00	1.65	2.00
Old Dominion Guano Co.'s Bullock's Cotton Grower	8.00	1.65	2.00
Old Dominion Guano Co.'s Miller's Special Wheat Mixture	8.00	....	4.00
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	7.00	5.76	7.00
Old Dominion Guano Co.'s Old Dominion Potato Manure	7.00	4.12	8.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Dominion Guano Co.'s 7 Per Cent Truck Fertilizer	6.00	5.76	6.00
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	6.00	5.76	5.00
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6.00	1.65	6.00
Old Dominion Guano Co.'s 70 Per Cent Truck Fertilizer	5.00	8.24	2.50
Powers, Gibbs & Co.'s Almont High Grade Acid Phosphate	14.00	....	....
Almont Acid Phosphate.....	12.00	....	....
Fulp's Acid Phosphate.....	13.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Best Acid Phosphate	13.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Acid Phosphate	12.00	....	....
Powers, Gibbs & Co.'s Acid Phosphate and Potash	10.50	....	1.50
Powers, Gibbs & Co.'s Almont Wheat Mixture.	10.00	....	3.00
Powers, Gibbs & Co.'s Dissolved Bone and Potash	10.00	....	2.00
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano	9.00	2.47	2.00
Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano	8.00	3.29	5.00
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone.....	8.00	3.29	4.00
Powers, Gibbs & Co.'s Old Kentucky High Grade Manure	8.00	2.47	3.00
Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano	8.00	2.47	2.00
Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano, for Tobacco.....	8.00	2.06	3.00
Powers, Gibbs & Co.'s Powers' Ammoniated Guano	8.00	2.06	2.00
Powers, Gibbs & Co.'s Gibbs' Ammoniated Guano	8.00	2.06	1.50
Powers, Gibbs & Co.'s Almont Soluble Ammoniated Guano	8.00	1.65	2.00
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano.....	8.00	1.65	2.00
Powers, Gibbs & Co.'s Eagle Island Ammoniated	8.00	1.65	2.00
Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Red Cross 14 Per Cent Acid Phosphate.....	14.00	....	....
Southern Chemical Co.'s Victor Acid Phosphate	13.00	....	....
Southern Chemical Co.'s Chatham Acid Phosphate	13.00	....	....
Southern Chemical Co.'s Reaper Grain Application	12.00	....	3.00
Southern Chemical Co.'s Tar Heel Acid Phosphate	12.00	....	....
Southern Chemical Co.'s Horseshoe Acid Phosphate	12.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Southern Chemical Co.'s Quickstep Bone and Potash	11.00	....	5.00
Southern Chemical Co.'s Solid South.....	10.00	....	6.00
Southern Chemical Co.'s Winner Grain Mixture	10.00	....	4.00
Southern Chemical Co.'s Farmers' Pride Bone and Potash	10.00	....	3.00
Southern Chemical Co.'s Winston Bone and Potash Compound	10.00	....	2.00
Southern Chemical Co.'s Mammoth Corn Grower	10.00	....	2.00
Southern Chemical Co.'s Mammoth Wheat and Grass Grower	10.00	....	2.00
Southern Chemical Co.'s Sun Brand Guano...	9.00	2.06	5.00
Southern Chemical Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8.00	2.47	2.50
Southern Chemical Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8.00	2.06	3.00
Southern Chemical Co.'s Electric Tobacco Guano	8.00	1.65	2.00
Southern Chemical Co.'s Electric Standard Guano	8.00	1.65	2.00
Southern Chemical Co.'s Yadkin Complete Fertilizer	8.00	1.65	2.00
Southern Chemical Co.'s Chick's Special Wheat Compound	8.00	....	4.00
J. G. Tinsley & Co.'s Powhatan Acid Phosphate	14.00	....	....
J. G. Tinsley & Co.'s Tinsley's Dissolved S. C. Bone	13.00	....	....
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate	12.00	....	....
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture	10.00	....	2.00
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer	8.00	3.29	2.50
J. G. Tinsley & Co.'s Richmond Brand Guano.	8.00	2.47	3.00
J. G. Tinsley & Co.'s Peanut Grower.....	8.00	1.00	4.00
J. G. Tinsley & Co.'s Killickinick Tobacco Mixture	8.00	2.06	3.00
J. G. Tinsley & Co.'s Lee Brand Guano.....	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Brand Guano.	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Tobacco Guano.	8.00	1.65	2.00
J. G. Tinsley & Co.'s Tinsley's Special Irish Potato Guano	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Ammoniated Guano for Beans, Peas, Cabbage, Strawberries, etc.	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's Irish Potato Guano	6.00	4.94	6.00
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower	6.00	3.29	4.00
J. G. Tinsley & Co.'s Tinsley's Top Dresser...	5.00	9.06	....
J. G. Tinsley & Co.'s Tinsley's 10 Per Cent Truck Guano	5.00	8.24	2.50
S. W. Travers & Co.'s Champion Acid Phosphate	16.00	....	....
S. W. Travers & Co.'s Travers' Dissolved Acid Phosphate	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
S. W. Travers & Co.'s Standard Dissolved S. C. Bone	13.00	....	....
S. W. Travers & Co.'s Capital Dissolved Bone. ash Compound	12.00	....	....
S. W. Travers & Co.'s Capital Bone and Pot- ash Compound	10.00	....	2.00
S. W. Travers & Co.'s Capital Truck Fer- tilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Capital Tobacco Fer- tilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Big Leaf Tobacco Grower	8.00	2.47	3.00
S. W. Travers & Co.'s Capital Cotton Fer- tilizer	8.00	2.06	2.00
S. W. Travers & Co.'s National Fertilizer.....	8.00	1.65	2.00
S. W. Travers & Co.'s National Special To- bacco Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Beef, Blood and Bone Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Peanut Grower.....	8.00	1.00	4.00
S. W. Travers & Co.'s Travers' Special Wheat Compound	8.00	....	4.00
S. W. Travers & Co.'s Travers' 7 Per Cent Truck Fertilizer	6.00	5.76	5.00
Virginia State Fertilizer Co.'s Bull Run Acid Phosphate	16.00	....	....
Virginia State Fertilizer Co.'s Gilt Edge Brand Acid Phosphate	14.00	....	....
Virginia State Fertilizer Co.'s Clipper Brand Acid Phosphate	13.00	....	....
Virginia State Fertilizer Co.'s Lurich Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Alps Brand Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Mountain Top Bone and Potash.....	10.00	....	5.00
Virginia State Fertilizer Co.'s XX Potash Mix- ture	10.00	....	4.00
Virginia State Fertilizer Co.'s Virginia State Dissolved Bone and Potash.....	10.00	....	2.00
Virginia State Fertilizer Co.'s Number One Soluble Guano	9.00	1.65	2.00
Virginia State Fertilizer Co.'s Highland King. Virginia State Fertilizer Co.'s Gamecock Spe- cial for Tobacco.....	9.00	1.65	1.00
Virginia State Fertilizer Co.'s Virginia State High Grade Tobacco Guano.....	8.50	1.65	2.00
Virginia State Fertilizer Co.'s Bull Dog Solu- ble Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Dunnington's Special Formula for Tobacco.....	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Peerless To- bacco Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Buffalo Guano. Virginia State Fertilizer Co.'s Austrian To- bacco Grower	8.00	2.06	3.00
Virginia State Fertilizer Co.'s Gilt Edge Spe- cial Tobacco Guano.....	8.00	2.06	2.00
Virginia State Fertilizer Co.'s Virginia State Guano	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Virginia State Fertilizer Co.'s Battle Axe Tobacco Guano	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.00	....	4.00
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Raw Bone Meal.....Total	21.73	4.10	....
<i>Williams & Clark Fertilizer Co., Charleston, S. C.—</i>			
Standard Amerieus Ammoniated Bone Superphosphate.....	9.00	1.85	1.00
<i>Winborne-Brown Guano Co., Norfolk, Va.—</i>			
High Grade Acid Phosphate.....	16.00	....	....
Standard Acid Phosphate.....	14.00	....	....
Soluble Bone and Potash.....	10.00	....	2.00
Big Triumph Guano	8.00	3.30	4.00
Farmers Select Guano.....	8.00	2.47	4.00
King Tammy Guano.....	8.00	2.47	3.00
Winborne's Tobacco Guano.....	8.00	2.47	3.00
Champion Crop Grower.....	8.00	1.65	2.00
Winborne's Excelsior Guano.....	8.00	1.65	2.00
Standard Eureka Guano.....	8.00	1.65	2.00
Climax Peanut Guano.....	8.00	.82	4.00
High Grade Top Dresser.....	7.00	7.82	3.00
Premium Top Dresser.....	6.00	7.40	3.00
Big Crop 7 Per Cent Guano.....	5.00	5.75	5.00
Nitrate of Soda.....	....	15.65	....
Muriate of Potash.....	....	....	50.00
Genuine German Kainit .....	....	....	12.00
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Wood's Pure Animal Bone.....Total	23.00	2.47	....
Standard H. G. Acid Phosphate.....	16.00	....	....
Standard High Grade Acid Phosphate.....	14.00	....	....
Standard Bone and Potash Mixture.....	10.00	....	2.00
Standard Corn Fertilizer.....	9.00	1.23	1.00
Standard Wheat Fertilizer.....	9.00	1.23	1.00
Standard Crop Grower Fertilizer.....	9.00	1.03	2.00
Standard High Grade Trucker Fertilizer.....	8.00	4.93	6.00
Standard Vegetable Fertilizer.....	8.00	2.47	3.00
Standard Potato Fertilizer.....	8.00	1.65	5.00
Standard Grain and Grass Fertilizer.....	8.00	1.65	2.00
Wood's Lawn Enricher.....	6.00	2.47	3.00
Nitrate of Soda.....	....	15.63	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
<i>Wessell, Dural & Co., New York, N. Y.—</i>			
Nitrate of Soda.....	....	14.85	....
<i>S. L. Warren, Calypso, N. C.—</i>			
Acid	16.00	....	....
<i>Wilson Chemical Co., Wilson, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
East Carolina Tobacco Grower.....	8.00	2.47	3.00
Brag Cotton Grower.....	8.00	2.05	3.00
McGee's Potato Special.....	6.00	3.30	8.00
<i>The J. R. Young Fertilizer Co., Norfolk, Va.—</i>			
High Grade 16 Per Cent Acid Phosphate.....	16.00	....	....
J. R. Young's Bone Mixture.....	10.00	....	4.00
Young's Bone and Potash Guano.....	10.00	....	2.00
J. R. Young 2¾-9-2 Special Guano.....	9.00	2.26	2.00
J. R. Young's 4-8-4 Crop Grower.....	8.00	3.29	4.00
J. R. Young's New Process 3-8-3 Guano for Tobacco	8.00	2.47	3.00
J. R. Young's New Process 2-8-2 Guano for Cotton, Corn and Peanuts.....	8.00	1.65	2.00
Pasquotank 5-6-7 Potato Grower.....	6.00	4.11	7.00
J. R. Young's Special Guano for Potatoes.....	6.00	4.11	5.00
J. R. Young's New Process Grower.....	5.00	5.76	3.50
J. R. Young's 3-6-6 Special Guano for S. P....	6.00	2.47	6.00
J. R. Young's 4-4-6 Special for Tobacco.....	4.00	3.29	6.00
J. R. Young's German Kainit.....	....	....	12.00

LEAF TOBACCO SALES FOR FEBRUARY. 1911.

Pounds sold for producers, first hand.....	11,111,087
Pounds sold for dealers.....	552,713
Pounds resold for warehouses.....	645,271
	<hr/>
Total.....	12,309,071

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Vol. 32, No. 3.

SUPPLEMENT, MARCH, 1911.

Whole No. 149.

- I. REPORT OF FARM WORK ON THE IREDELL TEST FARM.
- II. SUMMARY OF EXPERIMENTAL WORK WITH COTTON, CORN
AND PEAS.



Residence and Barn on Iredell Farm.

STATE BOARD OF AGRICULTURE.

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F. T. MEACHAM, Superintendent Iredell Test Farm, Statesville, N. C.

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R. W. COLLETT, Superintendent Transylvania and Buncombe Test Farms, Swannanoa, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, February 15, 1911.

SIR:—I submit herewith in manuscript a report of the more general work on the Iredell Test Farm, covering clearing and improvement of the land, rotations, crops and yields, buildings and equipment of the farm, and other things which it is thought will be of general interest to the public, and also a summary of the experimental work with cotton, corn and peas. The details of these latter have already been published. A general statement is made regarding live stock and horticultural work, but it is left for the heads of the departments having these in charge to give more detailed reports, at such time as it is thought best and the data justifies.

I recommend the publication of this report as the supplement to the March BULLETIN.

Respectfully,

B. W. KILGORE,
Director of Test Farms.

To HON. W. A. GRAHAM,
Commissioner of Agriculture.

I. REPORT OF GENERAL FARM WORK ON THE IREDELL TEST FARM, 1903-1910.

II. SUMMARY OF EXPERIMENTAL WORK WITH COTTON, CORN AND PEAS, 1903-1909.

By B. W. KILGORE, F. T. MEACHAM, F. S. PUCKETT.

I. REPORT OF GENERAL FARM WORK.

The Farm, consisting of 208 acres, was obtained in the fall of 1902, though work was not commenced until the spring of 1903. The citizens of Statesville made a considerable donation toward the purchase of the farm as an inducement to its location near that town. It is located about one and one-half miles west of the Court-house and fronts on the Taylorsville public road. The Taylorsville branch of the Southern Railway passes through the farm. In the main, the land is a red clay loam, with rather stiff clay subsoil.

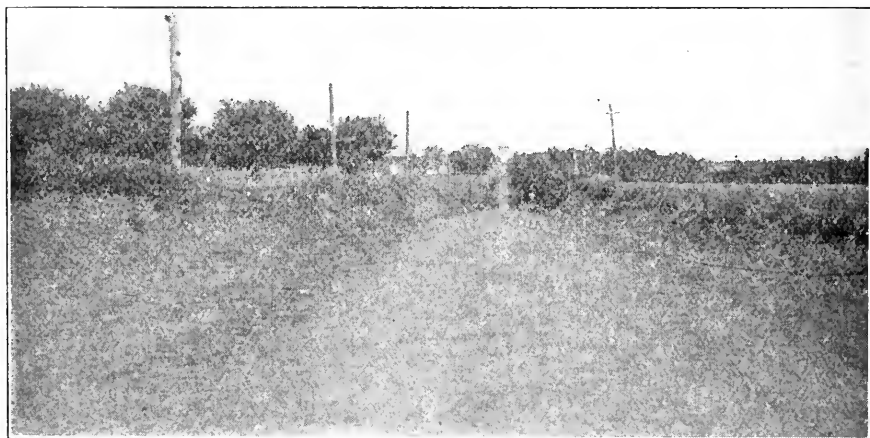


Figure —Macadam Road by Farm.

Only about twenty acres on the farm were in cultivation, the rest being in woods, old field pines, briers, etc. The land was badly washed and the information we obtained was that the portion in cultivation was producing about seven bushels of corn and 200 pounds of seed cotton per acre.

Object of the Farm.—The first and main object of the farm was to conduct experiments to obtain much needed new information as to the fertilizer needs of corn, the grains, cotton, peas and other

crops generally grown on this soil; the varieties of these crops, or other new ones which might be introduced to advantage, which would give best results; the improvement of these varieties by selection; the study of methods of growing and handling these crops; rotations for the soil and section, and methods and ways of soil improvement.

A number of Bulletins have been published giving the results of this experimental work, a summary of a portion of which will be found in another part of this report.

A second object in the location and conduct of the farm was to carry on general farming on a sufficient scale to apply the results and methods which the experimental work showed to give best results. The work in general farming has been conducted at a profit, and at the same time, by rotation of crops and a judicious use of fertilizers, the land has been increased in productiveness from two to four-fold.

A brief statement of what has been done in clearing and putting the farm in shape and in the conduct of the general work on it is given below.

1903.

Clearing Land.—A considerable portion of the land which could be most easily cleared was taken in during the spring of 1903, stumps being removed, terraces made to prevent washing, and all that could be of briers, broom sedge and other growth on the land turned under.

Crops.—Oats, corn, peas and cotton were grown this year, the amount of land and the results being as follows:

28 acres produced 370 pounds of seed cotton per acre, or 9 bales, at a cost of production of \$28 per acre. The cotton was fertilized with 400 pounds per acre, in the drill before planting, of a fertilizer containing 7 per cent phosphoric acid, $2\frac{1}{2}$ per cent nitrogen and $2\frac{1}{2}$ per cent potash, and which cost \$4.21.

16 acres of corn produced 440 bushels, or $27\frac{1}{4}$ bushels per acre (about 13 tons of stover were obtained from the corn crop). The cost of the corn per acre was \$14. The corn was fertilized with 300 pounds per acre of a fertilizer containing 7 per cent phosphoric acid, 3 per cent nitrogen and $1\frac{1}{2}$ per cent potash, which cost \$3.36.

10 acres of oats produced 140 bushels, or 14 bushels per acre, at a cost of production of \$7 per acre.

Buildings.—During the summer and fall of this year a barn 40x60 feet, with 18-foot sheds on each side, was built for use of

work stock, feed, storing implements and crops. The barn cost \$1,106. A four-room tenant house was put up at a cost of \$256, and platform wagon scales, at a cost of \$102.

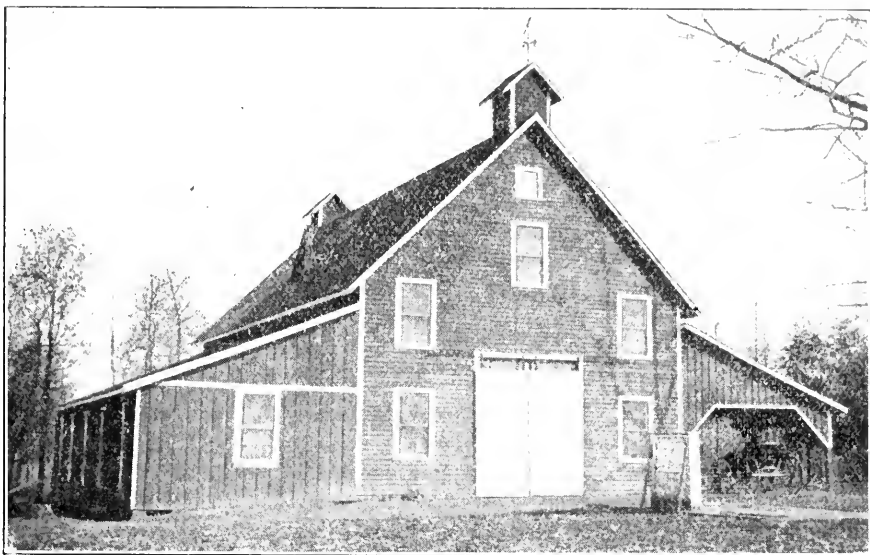


Figure 2—Barn on Iredell Farm.

Fall Plowing and Subsoiling.—During the fall and winter of each year as much plowing and subsoiling was done on the farm as was practicable. The cost of plowing and subsoiling ranged from \$4.25 to \$5.80 per acre.

1904.

Clearing Land.—During the winter and early spring 21 acres of land were cleared at a cost of \$16 to \$22 per acre, depending upon the amount of timber on the land and the number of stumps to be removed.

Crops, Rotation and Fertilization.—A three-year rotation was started this year, as follows:

First year.—Corn on the rougher land.

Second year.—Wheat or oats followed by peas.

Third year.—Cotton.

The wheat and oats were fertilized with 300 pounds per acre at the time of planting, of a fertilizer containing 8 per cent phosphoric acid, 2 per cent nitrogen and 1 per cent potash, costing \$2.55 per acre, and was top-dressed in the spring with 75 pounds per acre of

nitrate of soda, costing \$1.87, making the total cost of fertilizer \$4.42 per acre for the grain.

The results of fertilizing the wheat were as follows:

The unfertilized wheat produced $6\frac{1}{3}$ bushels per acre; the fertilized, 14 bushels, giving a difference of $7\frac{2}{3}$ bushels per acre due to fertilizer. With wheat at \$1 per bushel this would mean \$7.66. The cost of the fertilizer was \$4.42.

The oats showed a still greater difference in yield due to fertilizer, the yield being 10 bushels per acre for unfertilized and 21 bushels per acre with fertilizer, making a difference of 11 bushels per acre due to fertilizer. With oats at 60 cents per bushel this would be \$6.60.

Following the wheat and oats and after the ground had been plowed 8 to 10 inches deep, peas were planted, with an application of 300 pounds of 14 per cent acid phosphate per acre, costing \$2.10. Where the production of pea hay was as much as 1,500 pounds per acre it was cut and used for hay. Smaller amounts were left on the ground and plowed under the following spring when the land was broken to a depth of about 10 inches.

Cotton was planted the third year after the peas. This section of the State is in the northern extremity of the cotton belt, which makes the cotton crop too late to be followed by small grain. Crimson clover or rye is usually sown in the cotton as a cover crop and the land planted to corn the following spring.

During the first years crimson clover did not succeed on account of the seasons and poor land; in fact, the first satisfactory catch of crimson clover was obtained in cotton in the fall of 1910, after a good application of manure to the land the previous spring.

Crop Yields.—The crops and yields for this year were as follows:

50 acres of cotton yielded 28 bales, at a cost of \$16.25 per acre.

65 acres of corn produced 1,000 bushels of corn and about 30 tons of stover, the yield of corn being about $15\frac{1}{2}$ bushels per acre. and the cost \$15 per acre. The corn was grown mainly on the new and rough land, which accounts for the low yield and high cost of cultivation.

$6\frac{1}{2}$ acres of wheat produced 70 bushels or 10.8 bushels per acre. at a cost of \$7.70 per acre.

Buildings.—A cattle barn 60x100 feet, with large, roomy loft, was erected during the fall. This barn was built mainly for use in feeding cattle and was divided into eight stalls 18x20 feet, with water in each stall conveyed through pipes from the reservoir near the dwelling. The barn cost \$912. Two grain rooms 18x20 feet were made in the barn afterwards, and a 14-foot shed built on the south side, for sheltering the cattle and protecting the manure, at a cost of \$83, making the total cost \$995.

A ten-room two-story dwelling house for the Superintendent was erected at a cost of \$1,658, including plumbing and waterworks.

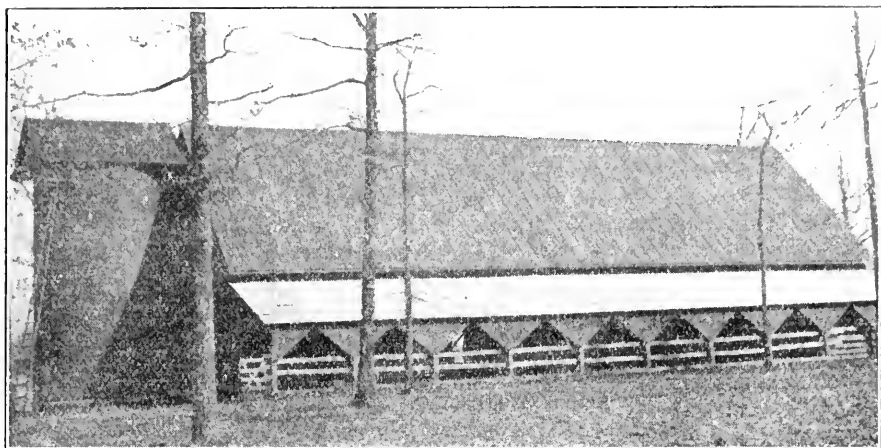


Figure 3—Cattle and Feeding Barn and Silo.

Well, Wind Mill, Water Tank.—A driven well, 2 inches in diameter and $138\frac{1}{2}$ feet deep, was put down at a cost, including pump, of \$125. An unused wind mill was obtained from a party in the town of Statesville and removed and erected at a cost of \$41. A 3,000-gallon galvanized iron tank was erected on a wooden framework at a cost of \$53. The well furnished an abundant supply of water for the house and work stock but not enough for the cattle during the winter when steers were being fed. Some trouble was had from sand getting into the well. To provide a storage basin for additional water a well was dug around the 2-inch pipe 34 feet deep and cased with 18-inch terra cotta, which was cemented at the joints. Holes were drilled in the 2-inch pipe to allow the water from the deep well to enter the larger one. The water rose sufficiently high in this latter to make about 3,000 gallons. The cost of the larger well and the terra cotta was \$60, making the total cost of wells, wind mill and tank \$304. This well now furnishes an abundant supply of water for all farm purposes.

Orchards.—A 5-acre pear orchard was put out in the fall at a cost of \$30 per acre. The four leading varieties, Kieffer, Le Conte, Bartlett and Duchesse, were planted. The trees were well cultivated, manured and mulched for three years; the land was then sown to red-top, blue grass and white clover to make a permanent sod and reduce the rate of growth, the idea being, based on observations made elsewhere, that pear trees growing slowly in sod land were not subject to the blight as they are when cultivated and fertilized. The

experiment has progressed nicely up to this time (1910). The Kieffer was planted alternately with the other varieties to aid in pollination.



Figure 4—Pear Orchard, Iredell Farm.

A small home orchard of peaches, apples, plums and cherries has proved a most valuable asset to the farm.

1905.

Clearing Land.—12 acres of land were cleared during the winter and spring at a cost of \$16 to \$22 per acre, depending on the number of stumps to be removed.

Crops.—Ensilage corn was grown on a portion of the rough land this year, mainly for the purpose of getting the land in shape for other crops; hence the low yield of only about 6 tons per acre of ensilage corn. Other land in good condition produced as much as 20 tons per acre, which was put in the silo, at a cost of \$1.55 per ton.

Crop Yields.—38 acres of cotton produced 21 bales, at a cost of \$19 per acre.

46 acres of corn produced 890 bushels and about 26 tons of stover, the acre cost of production being \$16. A good deal of the land in corn was new and rough land.

11 acres of wheat produced 140 bushels, at a cost of \$8 per acre.

Silo.—A 170-ton capacity silo, built after the modified Wisconsin plan, was erected during the summer. The silo is 17 feet in diameter and 34 feet high and will hold enough ensilage for 30 head of steers or 60 head of dairy cattle four months. The cost complete was \$225.

Hog Houses.—Four hog houses were built in the runs for the hogs at a cost of \$69.

During the year considerable work was done in terracing and ditching to prevent washing and a special scale was put down under the cattle shed for weighing the cattle.

1906.

Clearing Land.—23 acres of land were cleared of stumps during the winter, at a cost of \$19 per acre.

Orchards.—Two trees each of the leading varieties of pecans were put out to determine their suitability to the soil and climate of the section. The trees were planted 40x40 feet, peach trees being set between the pecan trees to fill extra space until the pecan trees became of sufficient size to make their presence undesirable.

Cattle.—A small herd of Short Horn cattle was obtained for the farm and pasturage put out for them. They were kept three years on the farm. With the farm in its condition at that time the pasturage was not sufficient to give them the growth and size necessary

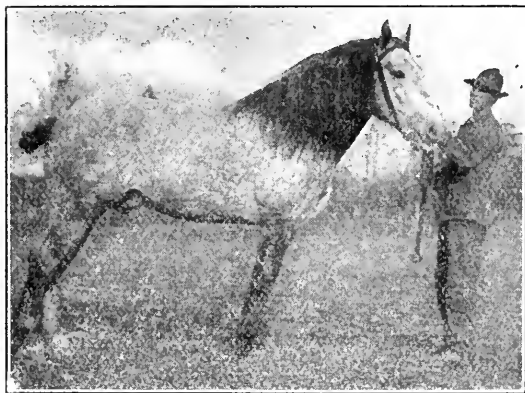


Figure 5—Percheron Stallion.

for good cattle. It was found necessary to feed them some throughout the year. These cattle were later transferred to the mountain farm.

Percheron Stallion.—An iron gray Percheron stallion, coming 4 years old, and weighing 1,500 pounds, was bought for the farm. A Percheron mare, which proved not to be a satisfactory breeder or very satisfactory animal, was obtained with him, the cost of the two, delivered, being \$1,530. The mare was afterwards disposed of. The stallion was broken to harness and made a good work horse on the farm, especially for plowing. He was worked regularly during the season when plowing was to be done.

During the first season the horse was not very popular, as he was a much larger horse and of a different type from the work horse generally used in the section. After some of his colts were seen the demand for his services increased, the average increase for each season being about 50 per cent for the four seasons he was on the farm. He died in June, 1910, of nephritis (commonly known as kidney colic).

His colts number 133 in eleven counties and are developing into splendid farm work animals.

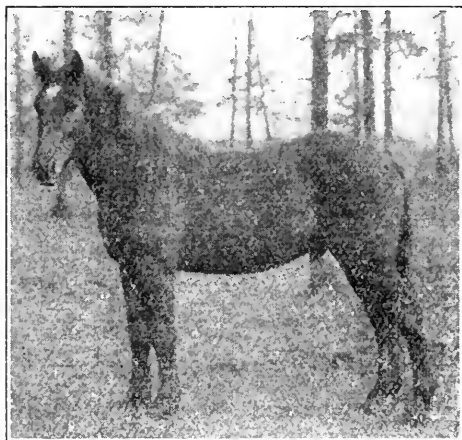


Figure 6—Grade Percheron colt raised on the Iredell Farm. The colt is coming three years old and weighs nearly 1,300 pounds.

A service fee of \$10 was charged, which made the revenue from the horse during the four years \$1,330. In addition to this he had to his credit all the work he did on the farm as work horse, which would pay for his keep. The per cent of foal was 51. This is rather low, but is as much as could be expected from the character of mares of the section.

Hogs.—A small herd of Poland China hogs was obtained for the farm and have proven a source of considerable profit, especially in the sale of pigs for breeding purposes. The pigs are as a rule sold from eight to ten weeks old.

Hog Pastures.—Eight $1\frac{1}{2}$ -acre lots were fenced separate with woven wire fence for the use of the hogs. While there was some variation in the crops grown on these lots in the different seasons the plan, in the main, was as follows:

- Lot No. 1. Alfalfa.
2. Rape.
3. Alfalfa.
4. Rape.

5. Orchard grass and red clover.
6. Rye.
7. Orchard grass and red clover.
8. Rye.

The hogs ran on the lots all winter. In addition to the pastures, the hogs were fed about 2 pounds of grain per day. The following spring the rape and rye lots were sown to peas and spring rape, the hogs being confined to the sod lots until the peas and rape had made a good growth and were then turned on them. The hogs were changed from the pea and rape lots to the sod lots as conditions necessitated. The hogs were not kept on the specially sown lots any special length of time, but were either on these or on the sod lots. This has reduced very materially the cost of raising pigs and making pork.

Crops and Yields.—20 acres of cotton produced 15 bales, at a cost of \$21 per acre.

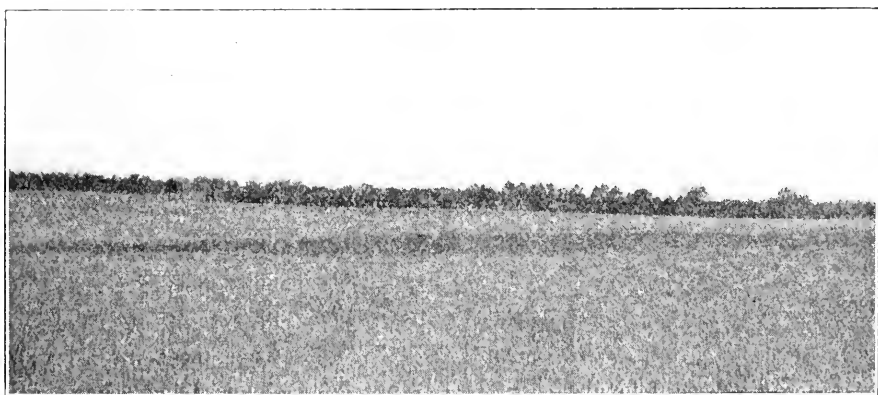


Figure 7—Wheat Field on Iredell Farm.

50 acres of corn produced 1,400 bushels and about 42 tons of stover, the yield of corn being 28 bushels per acre, at a cost of 32 cents per bushel.

6 acres of wheat produced 100 bushels or $16\frac{2}{3}$ bushels per acre, at a cost of 61 cents per bushel.

7 acres of oats produced 200 bushels or 28.6 bushels per acre, at a cost of 23 cents per bushel.

Peas, hay, soja beans and pork were also produced on the farm.

1907.

Clearing Land.—16 acres of land were cleared, but stumps were not removed. The cost of clearing was \$18 per acre. 31 acres of

the more recently cleared land was terraced at a cost of $6\frac{1}{2}$ cents per rod.

Crops and Yields.—30 acres of cotton produced 22 bales, at a cost of \$21 per acre.

44 acres of corn produced 1,100 bushels of corn and about 33 tons of stover, the yield of corn being 25 bushels per acre, at a cost of 32 cents per bushel.

10 acres of oats produced 360 bushels, or 36 bushels per acre, at a cost of 22 cents per bushel.

7 acres of wheat produced 142 bushels, at a cost of 63 cents per bushel.

1908.

Clearing Land.—10 acres of land were cleared of large stumps at a cost of \$14 per acre, and the stumps from four acres of original growth were removed at a cost of \$26.50 per acre. These stumps were large, mainly oak, and had to be blasted.

Buildings.—An additional four-room tenant house was erected at a cost of \$247, and a well put down and cased with terra cotta at a cost of \$15.30.

Orchard.—During the early spring a 4-acre orchard of varieties of peaches and apples was put out to make a test of the varieties of these fruits, which are the best suited to the section. The apple trees were set 40 feet each way and the peach trees put in between.

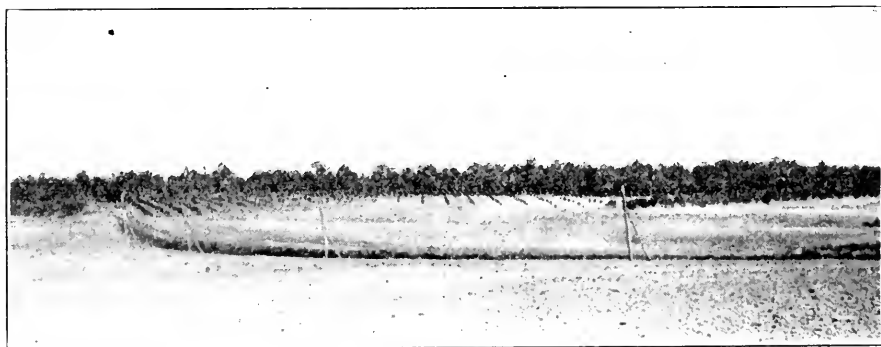


Figure 8—Orchard on Iredell Farm.

Crops and Yields.—30 acres of cotton produced 22 bales at a cost of \$21.60 per acre.

38 acres of corn produced 1,050 bushels of corn and about 32 tons of stover, the yield of corn being 38 1-6 bushels per acre, at a cost of 38 cents per bushel.

8 acres of wheat produced 82 bushels at a cost of 70 cents per bushel.

11 acres of oats produced 300 bushels at a cost of 23 cents per bushel.

96 tons of ensilage grown on rough land, was put into the silo, at a cost of \$1.65 per ton.

1909.

Clearing Land.—29 acres of land were cleared and a portion of it terraced at a cost of \$17 per acre.

Crops and Yields.—22 acres of cotton produced 21 bales at a cost of \$22 per acre.

24 acres of corn produced 1,042 bushels of corn and about 31 tons of stover, the yield of corn being about 43 bushels per acre, at a cost of $28\frac{1}{2}$ cents per bushel.

5 acres of wheat produced 83 bushels or 16.6 bushels per acre at a cost of 65 cents per bushel.

7 acres of oats produced 240 bushels, or 34.3 bushels per acre, at a cost of 26 cents per bushel.

50 tons of ensilage grown on 9 acres of new land were put in the silo at a cost of \$1.70 per ton.

Other Improvements.—During the summer and fall a considerable amount of work was done in clearing the pasture, putting the rather large grove around the house in shape and putting out grass and in making roads on the farm.

1910.

Improvements.—Nearly all the land on the farm had been cleared in previous years. Considerable time and money were expended this spring in terracing the unterraced land to prevent washing, underdraining with tile a small area which was wet and unproductive from this cause, and in grading and making farm roads; in fencing and putting out pasture for the colts and hogs; in seeding and making lawn around the house and barns, painting buildings, white-washing, etc.

Crops and Yields.—20 acres of cotton produced 22 bales at a cost of \$32 per acre. The cotton was more heavily fertilized this year than in previous ones, the amount being at the rate of 600 pounds per acre of a mixture containing 10 per cent phosphoric acid, 2 per cent nitrogen and 2 per cent of potash, except where manure was used or peas grown, when the quantity of nitrogen was reduced. This yield of cotton included the plat or experimental work of about five acres, the yield on a portion of which was very small, on account of the character of the tests which were being made.

32 acres of corn produced 1,140 bushels and about 34 tons of stover, the cost of the corn being 33 cents per bushel.

7 acres of wheat produced 120 bushels, or 17 bushels per acre, at a cost of 70 cents per bushel.

20 acres of oats produced 560 bushels at a cost of 29 cents per bushel.

70 tons of ensilage were put in the silo at a cost of \$1.70 per ton.

CATTLE FEEDING.

A car load or more of beef cattle obtained from the mountain counties of the State have been fed on this farm each season since 1905. Ensilage, corn stover, oat and wheat straw, short corn and cotton seed grown on the farm and cotton-seed meal purchased have been the feeds used. Sufficient has been obtained from the feeding to furnish fair prices for the feed purchased and grown on the farm, and in addition the manure has usually been obtained to cover the cost of labor.



Figure 9—Cultivating Corn.

The cattle fed in 1910 and the results obtained were as follows:

29 head of two and three-year-old grade Short Horn steers of medium quality were obtained in the mountain section of Ashe and Alleghany counties, and were driven across the country 67 miles to the farm. The steers being taken right off of grass lost around 75 pounds, largely stomach content, on the trip. It took ten days to two weeks to gain back this loss and to get them accustomed to new quarters and dry feed. The steers were divided into lots of five to six each, according to quality, and put in stalls 18x20 feet, with yards 12x20. These cattle were put on full feed about November 30, 1909, and were fed cotton-seed meal, cotton seed, ensilage, corn stover, small corn and oat and wheat straw. Different rations were fed to different pens. The results of these rations are not given here.

but only the general financial result of the feeding as a whole. The following amounts of feed were consumed by the cattle in 140 days:

120 bushels corn at 85 cents.....	\$ 102.00
100 bushels cotton seed at 43 cents..	43.00
3½ tons wheat and oat straw at \$7.....	24.50
9 tons stover at \$7.....	63.00
45 tons ensilage at \$3.....	135.00
3¼ tons cotton-seed hulls at \$8.....	26.00
8¾ tons cotton-seed meal at \$26.....	214.50

Total cost feed at farm prices.....	\$ 608.00
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Total cost of steers, interest and commission	\$1,021.83
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Total cost of feed consumed by cattle.....	608.00
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Total cost of cattle and feed	\$1,629.83
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Sale of 29 head of steers.....	1,621.68
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Deficit.....	\$ 8.15
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128 tons of manure at \$2 per ton.....	\$ 256.00
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Deficit.....	8.15
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Amount over cost.....	\$ 247.85
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Bedding cattle and labor in feeding.....	100.00
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Profit in feeding 29 head steers.....	\$ 147.85
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GRAZING AND FEEDING HOGS.

On February 14, 1910, 12 grade Poland China and Berkshire pigs, weighing about 30 pounds each, and costing \$4 per head, were obtained for the purpose of making a test of cost of raising pork on grazing crops, supplemented by grain feeds. There were six males and six females, the males usually making the better feeders. The pigs were run behind the cattle in the pens, receiving corn and ensilage. They were kept there for 21 days and received, in addition to what they obtained from the cattle, one pound each of corn per day.

On March 7th the pigs were put on the rape and rye lots and fed one pound corn each per day. The pigs ate the rape more readily than the rye and the former made about three times as much feed per acre as the rye. The pigs were then turned on rough pasture of native grasses and fed two pounds shelled corn each day until May 9th, when feed was changed to 2 pounds shorts with a little green feed for 30 days.

On June 10th they were turned on wheat stubble with red clover and no grain fed for 30 days.

On July 10th they were turned on summer rape for 15 days, then into pasture of native grass and fed one pound of corn daily each

for 15 days, and were then given the run of the cow pea and rape lots for 15 days.

On August 25th the hogs were put on soy beans and sorghum sown together, broadcast, and kept on this until October 3d without grain feed.

From October 3d to November 2d the hogs were fed 3 pounds corn daily with what soy beans and cane they could get.

On November 2d they were put in pens for fattening and fed 7 pounds corn daily each. They were continued on this feed 60 days and then killed and put on the market.

The hogs were 11 months old when killed and would have weighed 200 pounds dressed, as an average, but for two under-sized ones, which did not do as well as the others, and which cut down the average weight to 188 pounds. The pork was sold on the local market at 11 cents per pound.

The following is a financial statement showing cost of production and what was obtained:

12 pigs at \$4.....	\$ 48.00
106 bushels of corn at 70 cents.....	74.20
720 pounds shorts at \$1.65.....	12.00
Labor on pasture.....	24.00
Butchering and delivering.....	6.00
Total.....	\$164.20

This will give an average cost per hog of \$13.70.

The hogs averaged 188 pounds dressed and sold for 11 cents per pound, as follows:

12 hogs weighing 188 pounds each—2,256 pounds	
—at 11 cents.....	\$248.16
Feed consumed by 12 hogs and pasture.....	164.20
Profit.....	\$ 83.96

This gives an average of \$20.69 or a net profit per hog of \$6.98.

We advise for winter hog pasture, rape sown in September with crimson clover. Five pounds rape is ample per acre in the drill and 10 pounds broadcast. When rape is sown in the row and the clover does not catch, rye may be planted later between the rows.

Vetch, wheat and oats make an excellent winter pasture for hogs if sown early enough in September to get a start before cold weather. It pays to fertilize this mixture well

One-half bushel wheat,
One bushel oats,
15 pounds vetch make a good seeding.

Rape and clover sown in October or November make good spring grazing crops.

For summer grazing red clover is one of the best, if not the best, crops to grow.

Soja beans and sorghum sown broadcast, at the rate of 60 pounds of beans and 10 pounds sorghum seed per acre, make good grazing for both summer and fall.

In the red clay soils of this section of the State grazing crops are better suited for hog-raising than root crops, as it will materially injure the soil to have it rooted by hogs if at all wet. A V-shaped notch in the noses of the hogs will prevent rooting to a large extent. This method of preventing rooting has given better satisfaction with us than rings, and the notch is best cut when the pigs are around two months old.

ALFALFA.

Our experience with alfalfa has not been very encouraging on this farm. In 1903 about one acre of land was well prepared, fertilized and seeded and inoculated with soil from an old alfalfa field. The growth was not satisfactory, so in 1904 this area and an additional one was thoroughly prepared, subsoiled, limed, given a good dressing of stable manure and fertilizer and seeded. A good stand was obtained but the weeds and grass got the better of it during the summer months of July, August and September, when alfalfa makes very little growth.

GENERAL CROPS AND ROTATIONS.

During the eight years the farm has been operated the general crops have more than met the expenses of their production and their share of the cost of operating the farm. The general farming has been done at a considerable net profit and at the same time the land has at least doubled in productiveness, and a considerable portion of it is producing three and four times what it did at first. Cotton has been found a profitable crop on the farm, and for the first seven years a three-year rotation of corn, grain and peas was followed. One serious difficulty in this rotation was to get peas on the stubble land after grain had been harvested. Labor is scarce at this time of the year. There is a large amount of other work to be done on the farm and frequently it is impossible in dry seasons to plow the land so as to get in peas. In addition to these the pea crops does not make a large growth after grain, unless the rainfall is favorable and the fall is late.

Spring-sown red clover on fall-seeded grain will nearly always make a good catch and produce a good crop, there being a good cutting the first year and an excellent crop of hay the second and a second growth for seed or turning under for the improvement of the soil. In addition to being surer than peas, after the land is

gotten into good shape the labor and expense with the clover is less than with the peas. The clover, however, will not make a satisfactory growth, in our experience, until the land has gotten into rather a fair state of productiveness.

This four-year rotation for this section of the State possesses advantages over the three-year one where peas are used after grain.

PASTURE GRASSES.

For upland red clay and red clay loam soils we have found the following combination of grasses to give good results for pasture:

10 pounds orchard grass,
10 pounds red top,
5 pounds red clover,
14 pounds blue grass,

per acre.

SALE OF FARM SEEDS.

In our experimental work the main varieties of cotton, corn, wheat, oats and peas obtainable have been tested on the farm. After the first few years the variety of each which yielded best and seemed most promising for the section was selected for the main crop. Weakley's Improved Corn, King's Cotton, New Era Pea, Bearded Fulcaster Wheat and Apler and Culberson Oats are used for the main crops. These seeds are kept pure and are selected each year and the surplus seed of good quality have been sold to farmers for planting. The demand for these seeds grown on the farm is far greater than the supply and they are being generally used by farmers in the section.

WATERWORKS.

The deep well, wind mill and elevated tank already referred to are used for furnishing water to the dwelling, which has installed in it a water system including hot and cold water for kitchen and bathroom. Water is carried to the stalls for the horses and also to the cattle barns. The cost of the water system for the house was \$228.

SEPTIC TANK.

The septic tank was put in to dispose of the sewage from the house and cost \$8. It was constructed as follows:

A pit (No. 1) 4x10x8 feet was dug about 100 yards from the house and walled with brick lightly set in cement. Another pit (No. 2) 8x10x8 feet deep was dug next to pit No. 1, leaving a wall 2 feet thick between them, the pits being parallel. The walls in pit No. 2 are of clay soil. Sewage is conveyed in regular 4-inch sewer pipe into pit No. 1 for fermentation and generating heat. Decomposition takes place in pit No. 1 and the liquid portion

passes into pit No. 2, and from this, as a practically clear liquid, out into the soil. This is a better plan to dispose of sewage than to empty it into streams, as there is no danger from it after it has passed through the process of fermentation in the tank.

This tank not only disposes of the sewage, but it is used to furnish heat for a hotbed for early plants, the tank being located on the edge of the garden. The tank is covered over with good stout plank, a framework of plank put around this and then filled with good rich soil. The heat from fermentation is sufficient for hotbed purposes, and has been found very useful in this way.

VISITORS.

At least 1,000 people visit the farm each year. These people come mostly from Iredell and adjoining counties, though a considerable number come from a distance in the State and a few from other States have come to visit the farm. The number of visitors is increasing annually and the inquiries as to experimental and other work are also much greater than at first.

FARMERS' INSTITUTES.

The first institute held on the farm was in 1905, at which there was an attendance of about 400. The attendance for the years following have been as follows:

1906— 800.

1907— 900.

1908—1,000.

1909—1,200 men and 300 women.

1910—1,200 men and 300 women.

A branch of the Southern Railway runs through the farm, and in late years it has stopped its trains and put off those desiring to attend the institute on the farm. The most largely attended and the best institutes held in the State have been on this farm. In addition to the institute addresses opportunity is given to visitors to inspect the farm, the experimental and general crop work.

The foregoing covers in a brief way the more general work on the farm. The main object of the farm was for experimental purposes. In the following will be found a summary of experimental results with corn, cotton and cow peas:

II. SUMMARY OF EXPERIMENTAL WORK WITH COTTON, CORN AND PEAS.

Seven years' fertilizer and variety experiments have been conducted on the red clay loam soil of the Iredell Test Farm. On basis of these results and other information which we have, the suggestions below are given for the culture and fertilization of cotton on the red clay loams, red clays, and valley soils of the Piedmont, and the varieties of cotton which are best suited to them.

Cotton is not a hard or exhaustive crop on the soil, when the soil and crop are handled with care and intelligence. A bale of cotton (900 pounds of seed and 500 pounds of lint) removes from the soil in round numbers:

30 pounds nitrogen,
12 pounds phosphoric acid, and
13 pounds potash:

worth at present prices of fertilizer ingredients \$7.20. Only 48 cents worth of this is carried away in the lint. The seed can be sold for enough to return in commercial fertilizer considerably more plant food than the lint and seed took from the soil. Under conditions prevailing last year (1909) the seed can be sold for enough to purchase 100 per cent more fertilizer constituents in other fertilizer materials than are removed by the seed and lint. Nine hundred pounds cottonseed at present prices for fertilizer constituents are worth \$7.20. Nine hundred pounds seed at 45 cents per bushel would bring \$13.50, and at 50 cents, \$15, which is more than double the fertilizing value of the seed. In other words, when seed can be sold for 50 cents per bushel, twice the quantity of fertilizing constituents which they contain can be purchased in other fertilizer materials for what the seed will bring. The stalks, leaves, and bolls, which should never be burned or otherwise removed, and 95 per cent of which have come from the air, add vegetable matter or humus to the soil. If the land is liberally fertilized in the right way and protected from surface washing, it should continue to produce large and profitable crops of cotton from year to year, and with a good rotation and proper fertilization will increase in fertility and productiveness. None of our staple crops are as easy on the soil as cotton when handled in the way indicated above.

Preparation and Cultivation.—The land should be thoroughly and well prepared by breaking in the fall or early spring to a depth of 6 or 8 inches, and the soil may be gradually deepened beyond this to advantage. Before planting, cut up well with a disk harrow to get rid of clods and to make a good seedbed and run off rows $3\frac{1}{2}$ to 4 feet apart and on very fertile land $4\frac{1}{2}$ feet. As a rule, the fertil-

izer should be put in the drill before planting and the cotton planted on a level or just above the level, according to the season and drainage condition of the land. Weeders and light harrows may be run across the rows two or three times before and after the cotton is up and before cultivation with cultivators and hoeing begins. When the crop is well up and danger of frost is over, hoe and thin to a stand of 15 to 20 inches in the drill, leaving as nearly as possible one stalk in a place, and giving greater distance in the row and between rows as the productiveness of the land increases. On thin land the rows should be closer together and the cotton closer in rows, as the stalks do not grow very large; but distance should be given both ways as the land increases in productiveness, from whatever cause brought about. Cultivate with good one or two-horse cultivators, which will not require more than two furrows at greatest to the row, every ten days to two weeks and as nearly as possible after rains to keep down grass and weeds and to conserve the supply of moisture. The cultivation should be comparatively deep early in the season, becoming shallow as the crop grows and the root system develops. As the season in the Piedmont is short for cotton, it seems desirable not to continue the cultivation late on strong lands, as this will stop growth earlier and hasten maturity. On land producing strong growth it has been found to pay to top the cotton about August first, thus forcing the energies of the plant into development of fruit already set.

Varieties.—In seven years sixty varieties of cotton have been tested on the Iredell Farm, a number of these running through the entire period. The earlier maturing varieties of the King type have given the largest returns, though now and then, with a long season, the large boll, late-maturing kinds have stood well. Cottons of this latter type have made large, showy growth, but frost catches them too often to make them safe for that soil and section of the State. Among the varieties which done well are—

King's,	Williams',	Hodge,
Simpkins',	Edgeworth,	Shine's Extra Early
Sugar Loaf,	Webb,	Dozier's.

These are all small to medium boll, early-maturing varieties, a number of them being of the same origin. Cleveland's Big Boll and Cook's Improved, among the medium and large boll kinds, have done well.

The results of variety tests have been published each year and are summarized in the February (1909) BULLETIN. These results can be had for study by any one specially interested in them.

Fertilization.—Analysis of these soils show that they are very low in phosphoric acid, high in potash, and have a fair supply of lime, the quantity of nitrogen depending on the amount of vegetable or

organic matter in the soil. Experiments show that phosphoric acid is the most needed constituent for the production of cotton, it having produced about two-thirds of the increased yield and profit, and nitrogen and potash combined about one-third. It is not possible, with present results, to say just what is the best proportion of these three constituents for most profitable returns, but it is certain that the fertilizer should carry a very high percentage of phosphoric acid and comparatively low percentages of nitrogen and potash. The indications are that a mixture containing 10 or more per cent phosphoric acid and 2 per cent each of nitrogen and potash will give close to, if not the best returns. This mixture should be used for best results at the rate of at least 400 pounds per acre, and as much more as one can afford up to 1,000 pounds.

The nitrogen may be all derived from blood, tankage, cottonseed meal, or similar products, or in part from one or all of these, and in part (up to one-half) from nitrate of soda or sulphate of ammonia.

Kainit, manure salt, sulphate or muriate of potash may furnish the potash, and acid phosphate the phosphoric acid. Four hundred pounds of the above mixture would contain 40 pounds phosphoric acid, and 8 pounds each of nitrogen and potash, and 1,000 pounds would contain 100 pounds phosphoric acid and 20 pounds each of nitrogen and potash. The required amounts of phosphoric acid in 400 and 1,000 pounds respectively of this mixture would be supplied by 286 and 715 pounds of 14 per cent acid phosphate; the nitrogen by $61\frac{1}{2}$ and 154 pounds of 13 per cent dried blood, and the potash by 40 pounds and 100 pounds of 20 per cent manure salt. Other materials or other grades of these same materials may be used, and it will not be difficult, knowing just what they contain, to use such quantities of them as will be necessary to furnish the required amount of plant food, having in mind that it is the specific number of pounds of phosphoric acid, nitrogen, and potash that is desired, rather than a given weight of mixed fertilizer.

It is not more, but perhaps less, difficult to calculate the number of pounds of nitrogen, phosphoric acid, and potash to be applied per acre to any given crop from materials which are to be had than to estimate the exact number of pounds of the materials to make a formula of a certain composition: as for example, in an 8-2-2 goods. The question of filler does not have to be considered in doing this, as is necessary in making a fertilizer formula in the usual way. When it is desired, for instance, to apply the equivalent of 400 pounds per acre of a fertilizer mixture containing 10 per cent of available phosphoric acid, and 2 per cent each of nitrogen and potash, or 40 pounds of phosphoric acid and 8 pounds each of nitrogen and potash, it is only necessary to divide the number of pounds of plant food desired per acre (40, 8, and 8) by the percentage composition of the materials to be used, as follows:

Number of Pounds of Plant Food per Acre Wanted.	Percentage Composition of the Materials to be Used.	Number of Pounds of Fertilizer Materials per Acre to Apply.
Phosphoric Acid.....40 Lbs.	14 Per Cent Acid Phosphate	286 Pounds.
Nitrogen..... 8 Lbs.	13 Per Cent Dried Blood..	61.5 Pounds.
Potash..... 8 Lbs.	20 Per Cent Manure Salt..	40 Pounds.

The best and most economical way to apply this fertilizer is in the drill before planting, though there is no objection to dividing the application into two parts, putting one-half in the drill before planting and applying the other half as a side dressing around July first, according to season and growth of crop. It is certain that quantities of 400 pounds and less of fertilizer should not be applied broadcast.

Varieties, Culture, and Fertilization of Corn on Piedmont Red Clay Loam, Red Clay and Valley Soils.

Experiments have been conducted for seven years with fertilizers and varieties of corn on the red clay loam soil of the Iredell Test Farm. These results have been given in detail in the BULLETIN. On basis of these results and other information which we have the suggestions below are given for the culture and fertilization of corn on the red clay loams, red clays and valley soils of the Piedmont and the varieties of corn which are best suited to them.

Corn is an exhaustive crop on the soil, especially so when the stover is also removed. On basis of present prices of fertilizer one bushel of corn removes from the soil about 23 cents worth of plant food. It would cost this much to return the plant food in a bushel of corn to the soil in a commercial fertilizer. A fifty-bushel crop of corn has, therefore, removed plant food to the value of between \$11.00 and \$12.00. By good fertilization we have produced good yields, and increases over unfertilized areas have been obtained at a cost of 22.4 cents per bushel, which is practically the same as the plant food in a bushel of corn.

Preparation and Cultivation.—Corn delights in a thoroughly well prepared soil. The land should be broken in the fall or early spring to a depth of 6 or 8 inches and the soil may be gradually deepened beyond this to advantage. Before planting cut up the land with a disk harrow to get rid of clods and to make a good seedbed. Four feet is a good width for rows. The distance the corn is left in the row will depend on the productiveness of the land and should vary, usually, between 15 and 30 inches. The fertilizer on these soils should, as a rule, be put in the drill before planting and the corn planted just below the level. Weeders and light harrows may be

run across the rows two or three times before and after the corn is up and before cultivation with cultivators begin. Cultivate with good one or two-horse cultivators, which will not require more than two furrows at the greatest to the row every ten days or two weeks, and as nearly as possible after rains to keep down grass and weeds, and to conserve the supply of moisture. The cultivation should be comparatively deep early in the season, becoming shallow as the crop grows larger and its root system develops. It has been found desirable to continue the cultivation in this way until the corn is in silk and tassel, making the cultivation very shallow at last and going away some distance from the corn.

Varieties.—In the seven years' work on the Iredell Farm a very large number of varieties of corn of practically all the types generally grown have been tested. Those giving the best results are the ones belonging to the prolific or two or more ears to the stalk kind. Among these, Weekley's Improved, Cocke's Prolific and Biggs' Seven-Ear have done specially well. The results of variety tests have been published each year in detail and the results are summarized in the February (1909) BULLETIN. These results can be had for study by any one specially interested in them.

Fertilization.—Analysis of these soils show that they are very low in phosphoric acid, high in potash and have a fair supply of lime, the quantity of nitrogen depending on the amount of vegetable or organic matter in the soil. Experiments show that phosphoric acid is the most needed single constituent for the production of corn on these lands; nitrogen coming next and being very essential, while potash is of but little importance. It is likely not possible with present results to say just what is the best proportion of these constituents for most profitable returns, but it is certain that the fertilizer should carry a high percentage of phosphoric acid and nitrogen, and a low percentage of potash. Indications are that a mixture containing 10 per cent available phosphoric acid, 5 per cent nitrogen and $1\frac{1}{2}$ per cent potash will give close to if not the best returns. Six per cent of nitrogen is not too much on lands which have been grown continuously, or practically so, in cotton, corn and small grain. Five per cent nitrogen is equal to 6.08 per cent ammonia. This mixture can be used at the rate of 300 to 500 pounds per acre with good returns and profits. Larger quantities can be used with good results, but the profits, on basis of fertilizer used, will not be proportionately so large.

The nitrogen may be all derived from blood, tankage, cottonseed meal or similar products, or in part from one or all of these and in part from nitrate of soda or sulphate of ammonia. Nitrate of soda may be used as the entire source of nitrogen when divided into two parts and two applications are made.

Kainit, manure salt, sulphate or muriate of potash may furnish the potash, and acid phosphate the phosphoric acid.

Three hundred pounds of the above mixture would contain thirty pounds of available phosphoric acid, $4\frac{1}{2}$ pounds potash and 15 pounds nitrogen; and 500 pounds would contain 50 pounds available phosphoric acid, $7\frac{1}{2}$ pounds potash and 25 pounds nitrogen. The required amounts of phosphoric acid in 300 and 500 pounds respectively of this mixture would be supplied by 214.3 pounds and 357.1 pounds of 14 per cent acid phosphate; the nitrogen by 115.4 pounds and 192.3 pounds of 13 per cent dried blood, and the potash by 22.5 pounds and 37.5 pounds of manure salt. Other materials or other grades of these materials may be used, and it will not be difficult, knowing just what they contain, to use such quantities of them as may be necessary to furnish the desired quantities of plant food, having in mind that it is the specific number of pounds of phosphoric acid, nitrogen and potash that is desired rather than a given weight of mixed fertilizer.

It is not more, but perhaps less difficult to calculate the number of pounds of nitrogen, phosphoric acid and potash to be applied per acre to any given crop from materials which are to be had than to estimate the exact number of pounds of the materials to make a formula of a certain composition, as for example, in an 8-2-2 goods. The question of filler does not have to be considered in doing this, as is necessary in making a fertilizer formula in the usual way. When it is desired, for instance, to apply the equivalent of 500 pounds per acre of a fertilizer mixture containing 10 per cent available phosphoric acid, $1\frac{1}{2}$ per cent potash, and 5 per cent nitrogen, or 50 pounds phosphoric acid, $7\frac{1}{2}$ pounds potash and 25 pounds of nitrogen, it is only necessary to divide the number of pounds of plant food desired per acre (50, $7\frac{1}{2}$ and 25) by the percentage composition of the materials to be used as follows:

Number of Pounds of Plant Food per Acre Wanted			Percentage Composition of the Materials to be Used.	==	Number of Pounds of Fertilizer Materials per Acre to Apply.
Phosphoric Acid.....	50	Lbs.	14 Per Cent Acid Phosphate.	==	357.1 Pounds.
Nitrogen.....	25	Lbs.	13 Per Cent Dried Blood....	==	192.3 Pounds.
Potash.....	7.5	Lbs.	20 Per Cent Manure Salt....	==	37.5 Pounds.

The best and most economical way to apply the fertilizer in the quantities recommended here is in the drill before planting, though there is no objection to dividing the application into two equal parts, putting one-half in the drill before planting and applying the other half as a side dressing around July first according to season and growth of crop. The fertilizer in the quantity here suggested should not be applied broadcast.

I. Culture, Varieties and Fertilization of the Cowpea on Piedmont Red Clay Loam, Red Clay and Valley Soils and on Mountain Soils.

II. The Uses of the Cowpea.

Preparation and Cultivation.—The cowpea will thrive under very unfavorable conditions of soil and preparation except where the land is wet and cold. Where peas follow grain or other crops it is practically impossible in many cases to break and prepare the land well on account of season and pressure of other work, and under these conditions they should be put in in the best way possible and will frequently pay well for the expenditure, even under unfavorable conditions. While the above is true, there is no plant that delights more in a thoroughly broken and well-prepared soil or that returns greater profits for the expense and time in putting the soil in good condition before planting.

The cowpea and other leguminous plants are of more value for soil improvement than plants not belonging to this class, because they are able, through the bacteria that live on and in nodules on their roots, to gather a portion or all of their nitrogen from the air and use it in their growth. This nitrogen is taken from the air, which circulates in the soil and which comes in contact with the roots of the plant. The more deeply and thoroughly the soil is prepared the greater will be the root development of the cowpea or other plant, and the more air will circulate in the soil, thus enabling the crop to make a greater growth and accumulate more nitrogen for its own use and for the use of crops of corn, cotton and grains which follow.

Peas may be planted broadcast or drilled with a grain drill, when one bushel per acre is a good quantity of seed; or they may be put out in rows $2\frac{1}{2}$ to $3\frac{1}{2}$ feet apart, when one-half bushel per acre will give good results. When planted in rows peas should be cultivated two or three times with weeder, harrow or cultivator. The extra growth of crop and increase of nitrogen gathered from the air give profitable returns for the cultivation.

The size of seed of the different varieties of peas vary, some being twice as large as others, and it is not necessary to use so large a quantity of the small as of the large seeded kinds. The following table gives the results of three years' test of different quantities of seed in $3\frac{1}{2}$ -foot rows, the variety used being the New Era, the seed of which are small. These results show one-half bushel in rows of the above width to be a good seeding.

TEST OF DIFFERENT QUANTITIES OF SEED PER ACRE (NEW ERA.)

No. of Plat.	Bushels of Seed Used per Acre.	Yield of Peas in Bushels per Acre.			Yield of Hay in Pounds per Acre.			Average for Two Years of Peas in Bushels per Acre.	Average for the Three Years of Hay in Pounds per Acre.
		1904.	1905.	1906.	1904.	1905.	1906.		
1	.25	5.00	15.33 *	-----	1,480	4,800	2,090	6.77	2,790
2	.50	9.33	10.33 *	-----	2,600	4,600	2,400	6.55	3,000
3	.75	9.50	14.16 *	-----	2,400	3,600	2,120	7.88	2,706
4	1.00	10.00	13.00 *	-----	2,800	3,200	2,080	7.66	2,693
5	1.50	11.00	13.66 *	-----	2,520	3,400	2,280	8.22	2,733

*Peas rotted in field as a result of continued rains.

Varieties.—Six years' tests variety of cowpeas have been made on the Iredell Test Farm. These tests have included thirty-one (31) varieties, embracing the main ones grown in this and adjoining States, as well as many of the less important ones. The results are valuable as showing the varieties which are best suited to the State, and especially to the section where the experiments were carried on, for pea and hay production and for grazing and soil improvement. The summary of these several years' work is presented in the table below, which shows the varieties tested, the yield of peas in bushels and of hay in pounds per acre, date of planting, number of days to mature hay and peas, rank according to productiveness for both peas and hay, the number of peas to make a pound, which is a measure of the size of the individual peas; the color and shape of the peas, and the habit of growth of the several varieties, whether erect, half trailing or trailing. The rank of the several varieties according to productiveness of peas and hay has been arranged in groups, according to the number of years tested. Those varieties which have been tested four years or more are included in the general averages, and are given rank according to the amount of hay and peas each variety has yielded on an average during the years they have been grown. The other varieties have their averages for the number of years for which they have been grown, and are not given rank in comparison with the others, which have been grown for longer periods. In comparing varieties it is necessary that they should have been grown the same year and under the same conditions, as different seasons affect the yield very much, especially when planted late and follow grain, as was the case with most of our work.

SUMMARY OF RESULTS OF VARIETY TESTS OF COWPEAS ON REDELL TEST FARM IN 1903-08.

Number of Years Tested.	Peas.	Hay.	Variety Tested.	Average Yield of			Average Number of Days to Maturity.	Size of Seed— Number in Pound.	Color of Seed.	Shape of Seed.	Habit as to Growth of Plant.
				60 Pounds per Acre.	Pounds per Acre.	Per Acre.					
6	1	9	Whittle.....	13.5	2,953	101	86	2,041	Gray Mottled	Kidney.....	Half-trailing, holds leaves poorly.
6	2	8	Small Black.....	12.0	3,175	104	83	2,268	Black.....	Kidney.....	Vigorous, trailing, holds leaves poorly
6	3	11	New Era.....	11.9	2,727	100	74	3,629	Brown Speckled	Crowder.....	Half-trailing, holds leaves well.
5	4	4	Whippoorwill.....	11.7	3,424	100	83	2,494	Brown and Blue	Kidney.....	Erect, sheds leaves early.
6	5	17	Sixty-day.....	11.6	2,487	99	82	2,268	Red.....	Kidney.....	Low, half-trailing, sheds leaves early.
6	6	5	Red Crowder.....	10.4	3,412	108	93	2,721	Red.....	Crowder.....	Vigorous, half-trailing, holds leaves poorly.
6	7	10	Southdown.....	10.3	2,838	109	88	2,721	Brown Mottled	Kidney.....	Vigorous, half-trailing, holds leaves well.
6	8	1	Iron.....	9.9	3,872	102	83	3,856	Light Brown	Crowder.....	Very vigorous, erect, holds leaves well.
6	9	15	Large Black Eye.....	9.8	2,560	106	88	1,814	White.....	Kidney.....	Low, half-trailing, holds leaves poorly.
5	10	13	Powell's Early Prolific.....	9.6	2,636	100	85	2,268	Red and Clay	Kidney.....	Erect, holds leaves poorly.
6	11	14	Small Black Eye.....	9.2	2,609	103	88	2,494	White.....	Kidney.....	Vigorous, trailing, holds leaves poorly.
6	12	12	Small Lady.....	9.1	2,649	101	87	3,629	White.....	Crowder.....	Small and erect, holds leaves poorly.
6	13	6	Red Ripper.....	8.9	3,339	108	93	3,402	Red.....	Kidney.....	Vigorous, half-trailing, holds leaves poorly.
6	14	7	Yellow Sugar Crowder.....	8.6	3,179	110	93	2,260	Light Yellow	Crowder.....	Small, half-trailing.
4	15	16	Mealor's Clay.....	8.1	2,500	106	79	—	Clay.....	Crowder.....	Half-trailing, holds leaves poorly
4	16	18	Michigan Favorite.....	7.9	2,400	110	85	2,041	Clay.....	Crowder.....	Half-trailing, holds leaves well.
6	17	2	Clay.....	7.0	3,688	111	93	3,402	Clay.....	Kidney.....	Very vigorous, tall and erect.
4	18	3	Brown Coffee.....	6.6	3,430	111	93	2,405	Brown.....	Kidney.....	Trailing, holds leaves well.

3	.....	Brown-eye Crowder.....	9.3	2,647	112	89	2,948	White.....	Kidney.....	Large, half-trailing, holds leaves well
3	.....	Unknown.....	8.8	5,200	121	87	.....	Clay.....	Kidney.....	Trailing, holds leaves very well.
2	.....	Chinese Brown Eye.....	12.7	2,240	120	75	.....	White.....	Crowder.....	Half-trailing, holds leaves fairly.
4	.....	Unknown Black.....	9.2	3,700	92	87	2,268	Black.....	Kidney.....	Erect, holds leaves fairly well
2	.....	Clay Crowder.....	8.3	3,060	99	87	1,814	Clay.....	Crowder.....	Trailing, holds leaves well.
2	.....	Warren's New Hybrid.....	7.7	1,800	110	84	3,175	Clay.....	Crowder.....	Erect, holds leaves fairly well
2	.....	Black Crowder.....	6.3	2,200	120	85	.....	Black.....	Crowder.....	Erect, holds leaves poorly
2	.....	Delicious.....	3.4	1,100	112	79	.....	.....	.....	Erect, holds leaves poorly
2	.....	Chinese Red.....	3.3	1,100	112	77	.....	Red.....	.....	Erect, holds leaves poorly
1	.....	Chinese Whippoorwill.....	11.7	1,600	112	74	.....	.....	.....	Erect.
1	.....	Halsetine.....	7.2	1,800	90	87	.....	.....	.....	Erect.
1	.....	Warren's Extra Early.....	6.7	1,800	87	73	.....	Brown.....	.....	Erect
1	.....	Old Man.....	4.7	1,480	92	70	.....	Brown.....	.....	Erect.

The main uses of the cowpea are for the production of peas, of hay, for grazing and soiling, and for soil improvement. A study of the results in the summary table reveals, among others, the following interesting facts:

Peas.—The yield of peas in the varieties included in the tests for four or more years range from 13.5 to 6.6 bushels per acre, the varieties, in the order of productiveness, being:

Whittle,
Small Black,
New Era,
Whippoorwill,
Sixty-day,
Red Crowder,
Southdown,
Iron,
Large Black Eye,
Powell's Early Prolific,
Small Black Eye,
Small Lady,
Red Ripper,
Yellow Sugar Crowder,
Mealer's Clay,
Michigan Favorite,
Clay,
Brown Coffee.

The size of the seed vary from 1,814 to the pound in the case of the Large Black Eye to 3,856 in case of the Iron, there being more than twice as many peas in a pound or bushel of Iron than the Large Black Eye. This factor is not usually considered in determining the number of peas to plant to the acre, but should be, not so many peas of the small and medium sizes being necessary as of the large ones for the same area.

Hay.—The yield of hay in pounds per acre of the several varieties included in the test for four years and over vary from 3,872 pounds to 2,400 pounds, the rank in order of productiveness for hay being as follows:

Iron,
Clay,
Brown Coffee,
Whippoorwill,
Red Crowder,
Red Ripper,
Yellow Sugar Crowder,
Small Black,

Whittle,
 Southdown,
 New Era,
 Small Lady,
 Powell's Early Prolific.
 Small Black Eye,
 Large Black Eye,
 Mealer's Clay,
 Sixty-day,
 Michigan Favorite.

It should be said, however, that the largest yield of hay was produced from the Unknown, the average for three years being 5,200 pounds or 2.6 tons per acre, against a yield for the Iron, the highest yielder in the longer test period, of 3,872 pounds, or 1.9 tons hay per acre.

In addition to vigorous growth and large yield of hay, the character or habit of growth of the plant, whether erect, half erect or trailing, and the difficulty or ease with which it sheds its leaves, need to be considered. The trailing varieties are difficult to cut and handle, while the erect and half erect ones can be mowed and the hay saved with much greater ease than the trailing kinds. Some varieties shed their leaves early or they drop with great ease after cutting for hay. The leaves are the richest part of the pea plant for hay, and it adds greatly to the value of the hay variety for the leaves to remain long on the plant and to adhere tenaciously after cutting so that as few as possible of them will be lost. These facts are all given in the summary table, and show

Iron,
 Clay and
 Whippoorwill

to be specially valuable hay varieties.

Peas and Hay.—For the production of both peas and hay the following are among the best varieties, according to our tests:

Whippoorwill,
 Red Crowder.
 Iron,
 New Era.

Grazing and Soiling.—Where hogs are to be grazed and fattened after the peas are largely mature the heavy pea-yielding varieties are desirable; while for soiling and grazing with other live stock the heavy hay and pea-yielding varieties are favorites.

Soil Improvement.—Now and then you will hear the idea put forward that the main part of the soil-improving and fertilizing value of the cowpea is the roots. Some people used to think that

there would be as much improvement of the soil and increase in after crops from removing the hay as there would be if the entire plant were left. This is entirely erroneous. From 80 to 88 per cent of the fertilizing or soil-improving value of the cowpea is contained in the hay and peas which go with it, and 12 to 20 per cent remain in the roots and stubble. Different varieties vary in the proportions of hay and peas and roots and stubble. Our investigations now in progress include a further study of these questions for the purpose of throwing additional light on this phase of the problem of soil improvement from growing cowpeas. Since around 85 per cent of the soil-improving part of the cowpea is removed in the hay and peas, the large hay-producing varieties are the best for soil improvement. With this as our criterion, which is the correct one, the following varieties of peas are specially desirable for soil improvement:

Unknown,
Iron,
Clay,
Brown Coffee,
Whipporwill,
Red Crowder.

Fertilization.—As the cowpea is able to get a portion of its nitrogen from the air, it is not necessary on soils in fair to good condition to supply this constituent in fertilizers for this crop. Our experiments confirm this view. Other experiments and observations indicate that where nitrogen is supplied in the fertilizer or is contained in too great abundance in the soil, the cowpea may become lazy and is not as active in extracting nitrogen from the air as when it is necessary for it to obtain it from this source for its growth. On poor soils, where the plants start slowly and are sickly in appearance, it is profitable to add a small amount of nitrogen in the fertilizer, or, as a side dressing, to produce growth to the point where the root development will enable the peas to get the nitrogen they need from atmospheric sources.

On soils needing lime because they are deficient in it, or where they need lime to correct sourness or acidity, it should be applied.

The two important fertilizer constituents for the cowpea are phosphoric acid and potash, and it pays to supply these liberally, either combined or singly, according to the needs of the soil, as the plant can not make a satisfactory growth and add to the fertility of the soil without them.

A ton of pea-vine hay, in round numbers, removes from the soil
47 pounds nitrogen,

10 pounds phosphoric acid, and

29 pounds potash, and 1 bushel of peas with the hulls going with them (85 pounds) removes 2.3 pounds nitrogen, .6 pound phos-

phoric acid, and 1.4 pounds potash. At least sufficient phosphoric acid and potash should be supplied in the fertilizer to return what is removed in the crop, and considerably more if it is expected to keep up the productiveness of the land by supplying the waste from washing and leaching. Our experiments already reported on the red-clay loam of the Iredell Test Farm show that this soil does not need potash for pea production. The analysis of the soil shows it to be comparatively high in potash. Our analyses of red (cecil) clay loams from other parts of the piedmont, red (cecil) clays, and valley lands prove them to be as rich or richer in potash than the soils on which we experimented. We therefore feel safe in concluding that these piedmont soils, which make up the main farming area of the Piedmont section of the State proper, do not need potash for growing peas. In like manner analyses of the valley and main upland soils of the mountains show them to be high in potash; and experiments with other crops on the Buncombe Farm on high potash soils show that they do not respond, to any considerable extent at least, to applications of potash. For the present at least, and until contradictory evidence is obtained, we feel that we are safe in advising that potash is not necessary in the growth of peas on the soils referred to above in the piedmont and mountain districts of the State. This is likely true, also, of the clovers and other leguminous crops. This should mean no small saving to the farmers growing this crop on these soils. The yield of hay on the Iredell Farm varies from less than a ton to more than three tons per acre, according to season and variety. Three tons of hay would remove 30 pounds phosphoric acid, which would be almost returned by 200 pounds 14 per cent acid phosphate. Our best results were obtained from the use of 300 to 500 pounds of 14 per cent acid phosphate per acre. We would, therefore, suggest the following fertilization for piedmont red clay, red-clay loam and valley soils, and mountain, valley and main upland soils per acre:

FOR LAND IN FAIR TO GOOD CONDITION.

Acid phosphate, 14 per cent.....300 to 500 pounds.

Three hundred pounds would contain 42 pounds phosphoric acid and 500 pounds 70 pounds phosphoric acid. Acid phosphate of other grades can be used to supply these amounts of phosphoric acid.

FOR POOR LAND.

Acid phosphate, 14 per cent.....300 to 500 pounds.

Dried blood 30 to 50 pounds.

In case acid phosphate has been used and it is found that the peas are not making a satisfactory start, a side dressing of 50 to 75 pounds nitrate of soda may be applied to advantage.

II. Uses of the Cowpea.

The main uses of the cowpea are for grazing and soiling, hay and soil improvement.

Grazing and Soiling.—The cowpea is largely grown in the South for grazing hogs, especially, as well as other animals; its use for this purpose being more appreciated and extended from year to year. Cattle, sheep and like animals must become accustomed to it and be put on it gradually before they are allowed full pasture, or bad results may follow. It is used for soiling with excellent results, and to some extent for silage when grown with corn. The richness of the green pea vines and leaves, green and ripe peas in protein, or muscle and lean meat and milk-producing constituents, make it a most valuable plant for these purposes. Where hogs are to be grazed and fattened on the peas the Whittle is one of the best varieties, as it produces a large yield of peas of large size. Small Black, New Era and Whippoorwill are also good varieties.

Hay.—Pea-vine hay is difficult to cure, especially if the weather is not favorable. Different methods or modifications of methods are followed in different sections with greater or less success. Where an individual has found a particular plan to be successful, or where he knows that a method followed by some one else has given satisfactory results, it is well to follow it, though there are a number of standard ways of handling the crop and which are generally known to growers of peas. Our only suggestion here is that it be handled as little as possible, as the leaves of many of the varieties drop easily, and outside of the peas in pod the leaves are the most valuable part of the hay. Pea-vine hay ranks in feeding value with the clovers, vetch and other leguminous hays, and is practically equal in feeding value to wheat bran for what is eaten by the animal. By this is meant that animals will not, especially where the stems are tough, eat up clean all of the hay, but what is eaten is equal in milk and butter and growth-producing value, pound for pound, to wheat bran. If ground, as it might be, as alfalfa is at present, to produce pea hay or pea-vine meal, it should sell as readily on the market and at practically the same price as wheat bran, which is now more than \$30 per ton. This is a possible profitable industry for sections of the South where feeds are high, which is almost everywhere, and where pea-vine hay is grown in large quantity. It has a much higher feeding value than the grass and similar hays, and we can not better show its merit than by comparison with wheat bran, which is universally recognized as a feed of general usefulness and high merit.

The following table shows the comparative composition and feeding value of pea-vine hay and wheat bran:

PERCENTAGE COMPOSITION AND COMPARATIVE FEEDING VALUE
OF COWPEA-VINE HAY AND WHEAT BRAN.

	Protein	Fat.	Nitro- gen—Free Extract.	Fiber.
Cowpea-vine hay.....	14.9	2.6	41.2	21.5
Wheat bran.....	15.0	4.0	53.9	9.0

The table below shows the comparative fertilizing and manurial value of one ton each pea-vine hay and wheat bran:

NUMBER OF POUNDS OF PHOSPHORIC ACID, POTASH, AND NITRO-
GEN IN ONE TON PEA-VINE HAY AND WHEAT BRAN AND VALUES
PER TON.

	Amounts—Pounds.			Values per Ton.			
	Nitro- gen.	Phos- phoric Acid.	Potash.	Nitro- gen.	Phos- phoric Acid.	Potash.	Total.
Cowpea-vine hay.....	47.6	10.4	29.4	\$ 8.57	\$.52	\$ 1.47	\$ 10.56
Wheat bran.....	52.0	56.0	32.0	9.36	2.80	1.60	13.70

A study of the results of the variety tests already presented will show the ones which are specially desirable for hay, among them being the following:

Iron,
Unknown,
Clay,
Brown Coffee,
Whippoorwill.
Red Crowder,
New Era.

Soil Improvement.

The cowpea is likely grown more largely for soil improvement than for all other purposes combined, and if it has a use greater than for soil improvement, it is second only to its feeding value, which has already been seen to be high.

Nitrogen is the most costly constituent in fertilizers. The cowpea is able to get its supply of this constituent from the inexhaustible supply of nitrogen in the air. This nitrogen is taken from the air circulating through the soil spaces by the very minute, microscopic organisms living on and in the nodules, warts, or enlargements on the

roots of the cowpea plant. These nodules are the home of the bacteria and are shown in the cut on another page. Corn, cotton and the grains are not able to thus get nitrogen from the air, but must be supplied with it through fertilizers or from the cowpea and other leguminous plants, after they have obtained it and used it in their growth and have decayed in the soil. One ton of pea-vine hay contains in round numbers 47 pounds nitrogen, the greater portion, or all, of which it has obtained from the air, and if left on the soil or when turned under this amount of nitrogen, corresponding to more than 600 pounds cotton seed meal, is added to the soil for soil improvement and for the growth of other crops. The yield of pea-vine hay on fair land varies from one to three tons, and the amount of nitrogen thus collected and stored in the soil is seen to be large, and in addition to this must be considered the value of the organic matter in improving the texture and physical condition of the soil.

The question frequently arises as to whether or not it is best to cut and use the vines for hay or allow them to remain on the soil for its improvement. The feeding value of the hay needs to be considered in this connection, as the feeding value can be obtained, and under the most favorable conditions 70 to 80 per cent of the fertilizing value be returned to the soil in the manure. This is seldom accomplished, however, with the methods followed for saving and handling manure. In most cases likely not over 50 per cent and generally much less than this finds its way back to the land. If the improvement of the land is the sole of main question, there can be but one answer, and that is to leave the entire crop on the soil. In addition to the 47 pounds of nitrogen there are in a ton of pea-vine hay 10 pounds phosphoric acid and 29 pounds potash, which would be worth, at the present prices for these three constituents in fertilizers, namely, 18 cents per pound for nitrogen, 5 cents per pound each for phosphoric acid and potash, \$10.56 per ton. These constituents average around 85 per cent of the entire fertilizing value of the pea crop, which is made up of hay, roots and stubble, the roots and stubble containing on an average about 15 per cent of the fertilizer constituents of the cowpea crop. Good crops of cowpeas grown on land and left there will improve it rapidly, but if the hay is removed and exhausting crops are planted in rotation the productiveness of the soil will be but slightly increased or not at all, unless judicious fertilization is followed.

Turning under large crops of cowpeas in the fall, to be followed by small grain, frequently results in disappointment because of reduced yield in comparison with land which did not have the peas. This is due to the habit of growth of the small grain, which require a compact soil. The peas leave the soil too open and porous. This interferes with root development and water-holding capacity. If the crop is handled properly this difficulty will not be encountered. On heavy

land small crops of peas may be turned under green and greatly improve the texture of the soil, besides the addition of the fertilizer constituents of the pea. The safest way with moderate size and large crops is to cut them with a disk harrow or some other implement, allow them to wilt or even dry on the soil, and then turn them under. On light soils the trouble is likely to be more serious, and here it is especially necessary to either cut up large crops or else allow them to remain on the soil until after frost, and even into the winter or early spring. On heavy, as well as light land, this practice is good, as the vines will then become at least partially decomposed and can be turned under during the winter or before planting in the spring. There may be some loss from remaining on the surface, but this will in all likelihood be overcome if not exceeded by prevention from washing.

The large hay-yielding varieties, as the Iron, Clay, Unknown and Whippoorwill, are best suited for soil improvement.

THE BULLETIN

OF THE

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DEPARTMENT OF AGRICULTURE,

RALEIGH.

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I. ANALYSES OF FERTILIZERS—SPRING EASON, 1911.

II. REGISTRATION OF FERTILIZERS.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, N. C., April 15, 1911.

SIR:—I submit herewith analyses of fertilizers made in the laboratory of samples collected during the spring. These analyses show fertilizers to be about as heretofore, and to be, generally, what was claimed for them. I recommend that it be issued as the April BULLETIN.

Very respectfully,

B. W. KILGORE,
State Chemist.

To HON. WILLIAM A. GRAHAM,
Commissioner of Agriculture.

I. ANALYSES OF FERTILIZERS—SPRING SEASON, 1911.

By B. W. KILGORE,

W. G. HAYWOOD, J. M. PICKEL, J. Q. JACKSON AND W. H. STROWD.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the spring months of 1911. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural state, the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them.

They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion or all of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid, and potash in the materials supplying them. These values are only approximate (as the costs of fertilizing materials are liable to change, as other commercial products are), but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid, and

potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

VALUATIONS FOR 1910.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag, and Peruvian guano	3½	cents per pound.
For nitrogen	18	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid.....	4½	cents per pound.
For nitrogen	19½	cents per pound.
For potash	5½	cents per pound.

VALUATIONS FOR 1911.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag, and Peruvian guano	3½	cents per pound.
For nitrogen	19½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid.....	4½	cents per pound.
For nitrogen	21	cents per pound.
For potash	5½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percutage or Lbs. in 100 Lbs.</i>	<i>Value Per 100 Lbs.</i>	<i>Value Per Ton, 2,000 Lbs.</i>
8 pounds available phosphoric acid at 4½ cents...	0.36 × 20 =	\$ 7.20
2 pounds potash at 5½ cents.....	0.11 × 20 =	2.20
1.65 pounds nitrogen at 21 cents.....	0.347 × 20 =	6.94
Total value.....	0.817 × 20 =	\$16.34

Freight and merchant's commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table:

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS.—From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads of not less than ten tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance.....	\$ 3.20	\$ 3.20	\$ 3.40	\$ 3.20
Apex.....	2.70	3.20	3.80	3.00
Ashboro.....	3.20	3.20	3.60	3.20
Asheville.....	4.00	4.00	4.00	4.00
Chapel Hill.....	2.95	3.20	3.90	3.20
Charlotte.....	2.65	3.20	2.85	3.20
Clayton.....	2.48	2.86	3.63	2.80
Cherryville.....	3.85	3.60	3.40	3.63
Clinton.....	1.60	3.00	3.20	3.00
Creedmoor.....	3.00	3.00	3.80	3.00
Cunningham.....	3.00	2.40	4.00	2.40
Dallas.....	3.00	3.60	3.40	3.60
Davidson College.....	3.00	3.20	3.20	3.20
Dudley.....	1.70	3.00	3.20	3.00
Dunn.....	2.00	2.80	3.20	2.80
Durham.....	2.80	2.83	3.20	2.83
Elkin.....	3.60	3.20	3.60	3.20
Elm City.....	2.10	2.60	3.20	2.60
Fair Bluff.....	1.60	3.80	2.40	3.80
Fayetteville.....	1.80	2.00	3.00	3.00
Forestville.....	2.85	3.00	3.80	3.06
Gastonia.....	3.12	3.25	3.12	3.25
Gibson.....	2.10	3.50	2.10	3.50
Goldsboro.....	1.80	2.80	3.20	2.80
Greensboro.....	2.96	3.00	3.40	3.00
Hamlet.....	2.00	3.00	3.60	3.00
Henderson.....	3.00	2.83	3.55	2.83
Hickory.....	3.20	3.60	3.20	3.60
High Point.....	3.00	3.08	3.40	3.08
Hillsboro.....	2.88	2.88	2.68	2.88
Kernersville.....	3.00	3.00	3.40	3.00
Kinston.....	2.10	2.80	3.50	2.80
Laurel Hill.....	1.90	2.40	3.80	3.40
Laurinburg.....	1.90	3.40	3.80	3.40
Liberty.....	2.72	3.60	3.80	3.60
Louisburg.....	2.95	3.00	3.80	3.00
Lumberton.....	1.60	3.60	3.70	3.60
Macon.....	3.05	3.00	3.85	3.00
Madison.....	3.00	3.00	3.40	3.00
Matthews.....	2.60	3.20	3.20	3.20
Maxton.....	1.80	3.40	2.70	3.40
Milton.....	3.44	2.40	4.00	2.40
Mocksville.....	3.36	3.20	3.40	3.20
Morven.....	2.55	3.60	2.50	3.60
Mount Airy.....	3.20	3.40	3.80	3.40
Nashville.....	2.30	2.90	3.40	2.90
New Bern.....	1.25	1.75	3.95	1.75
Norwood.....	3.68	3.20	3.20	2.25
Oxford.....	3.04	2.83	3.55	2.83
Pineville.....	2.77	3.25	3.00	3.20
Pittsboro.....	2.60	3.30	4.10	3.30
Polkton.....	2.40	3.00	2.20	3.00
Raleigh.....	2.56	2.83	3.40	2.83
Reidsville.....	3.00	2.96	3.40	2.36
Rockingham.....	2.10	3.00	3.80	3.00
Rocky Mount.....	2.20	2.50	3.40	2.50
Ruffin.....	3.28	2.80	3.40	2.20
Rural Hall.....	3.28	3.20	3.60	3.20
Rutherfordton.....	3.05	3.65	3.05	3.65
Salisbury.....	3.25	3.20	3.20	3.20
Sanford.....	2.10	3.00	3.40	3.00
Selma.....	2.10	2.80	3.20	2.80
Shelby.....	2.90	3.60	3.90	3.60
Siler City.....	2.60	3.60	3.80	3.60
Smithfield.....	2.20	2.80	3.20	2.80
Statesville.....	3.50	3.20	3.60	3.20
Stem.....	2.95	2.83	3.80	2.83
Tarboro.....	2.30	2.40	3.00	2.40
Waco.....	2.90	3.60	3.40	3.60
Wadesboro.....	2.30	3.00	2.50	3.00
Walnut Cove.....	3.00	3.00	3.40	3.00
Warrenton.....	3.05	3.25	4.10	3.25
Warsaw.....	1.50	3.00	3.20	3.00
Washington.....	2.65	1.75	2.25	1.50
Weldon.....	2.95	1.90	3.85	1.90
Wilson.....	2.00	2.60	3.20	2.60
Winston-Salem.....	3.00	3.00	3.40	3.00

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	
				8 00	---	---	1 65	2 00	1 50 \$ 15 83
8989	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	Shelby	9 25	1 02	.56	1 58	1 92	1 51 16 62
				8 00	---	---	1 65	2 00	2 00 16 34
9118	American Fertilizer Co., Norfolk, Va.	A. L. Hannah's Special Formula	Dunn	8 24	1 04	.56	1 60	1 94	2 71 17 11
9082	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Base and Potash Compound.	High Point	8 29	.58	1 16	1 74	2 11	2 06 17 03
9187	do	do	Fountain	8 04	1 34	1 08	2 42	2 94	3 01 20 71
8858	do	Baugh's Fish Mixture	Hertford	7 99	1 06	.82	1 88	2 29	1 97 17 25
9132	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Cotton Grower	Concord	9 01	.94	.62	1 56	2 02	1 95 16 89
8925	Cooper Guano Co., Wilmington, N. C.	Cooper's Sterling Complete Guano	Wilmington	9 36	1 12	.52	1 64	1 99	2 44 18 00
8968	Farmers Cotton Oil Co., Wilson, N. C.	Farmers' Special Guano	Fayetteville	7 22	.72	1 22	1 94	2 36	2 92 17 86
8821	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Mount Gillead	8 54	.96	.86	1 82	2 21	2 43 18 00
9112	Fremont Oil Mill Co., Fremont, N. C.	Up-to-date	Fremont	8 18	.78	1 12	1 90	2 31	2 22 17 78
8944	Hampton Guano Co., Norfolk, Va.	Shirley Superphosphate	Clinton	8 54	1 02	.52	1 54	1 87	3 31 17 79
8861	Harrell, S. B., & Co., Norfolk, Va.	Harrell's Champion Cotton and Peanut Guano.	Edenton	8 44	1 14	.56	1 70	2 70	1 93 16 86
8809	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Exchange Guano	New Bern	7 49	.74	1 04	1 78	2 16	2 49 16 95
9214	Imperial Co., Norfolk, Va.	Champion Guano	Mount Gillead	8 42	1 24	.50	1 74	2 11	2 00 17 09
8813	Martin, D. B., & Co., Richmond, Va.	Martin's Carolina Cotton Fertilizer	New Bern	8 54	.52	1 22	1 74	2 11	2 06 17 26

MIXED FERTILIZERS.

8838	---do---	Old Honesty Guano	Wadesboro	8 65	.56	1 24	1 80	2 19	2 52	18 12
9178	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer.	Cerro Gordo	8 38	1 14	.74	1 88	2 29	2 17	17 82
8801	---do---	Atlantic and Virginia Fertilizer Co.'s Eureka.	Raleigh	9 12	2 02	.56	2 58	3 14	2 28	21 55
9108	---do---	Charlotte Oil and Fertilizer Co.'s King Cotton Grower.	Fremont	8 37	1 38	1 22	2 60	3 16	2 08	20 74
9031	---do---	Paye & Whittle's Owl Brand Guano.	Waxhaw	9 51	1 16	.56	1 72	2 09	1 95	19 93
8954	---do---	Durlam Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Lumberton	8 92	.48	1 30	1 78	2 16	2 07	17 78
8890	---do---	Farmers' Favorite Fertilizer	Raleigh	8 30	.86	1 34	2 20	2 67	2 24	19 28
8873	---do---	Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Guano	Wadesboro	8 22	.62	1 36	1 98	2 41	2 32	18 27
9002	---do---	Old Dominion Guano Co.'s Old Dominion Soluble Guano.	Mooresville	9 53	1 00	.56	1 56	1 89	1 81	17 12
8916	---do---	Plant Food	Whiteville	8 39	.50	1 26	1 76	2 14	2 67	17 88
9065	---do---	Powers, Gibbs & Co.'s Eagle Island Ammoniated Guano.	Clinton	10 98	.60	1 04	1 64	1 99	2 08	19 06
8938	---do---	Powers, Gibbs & Co.'s C. S. M. Soluble Ammoniated Guano.	Roseboro	8 49	.28	1 56	1 84	2 24	2 05	17 62
8921	---do---	Travers & Co.'s Beef, Blood and Bone Fertilizer.	Whiteville	8 64	1 08	64	1 72	2 09	2 08	17 29
9064	---do---	Travers & Co.'s National Fertilizer	Warsaw	8 43	1 02	64	1 66	2 02	2 18	16 86
9030	---do---	Virginia State Guano	Waxhaw	9 99	1 06	.56	1 62	1 97	1 51	17 45
Brands claiming										
8810	Hubbard Guano Co., Baltimore, Md.	Hubbard's Fish Compound	New Bern	8 30	.88	.92	1 80	2 19	3 00	18 33
8926	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Banner	Wilmington	8 17	.78	1 02	1 80	2 19	3 40	18 65
9152	Pocomoke Guano Co., Norfolk, Va.	Crescent Complete Compound	Wilmington	8 15	1 20	54	1 74	2 11	2 83	17 75
Brand claiming										
9125	Pocomoke Guano Co., Norfolk, Va.	Monticello Animal Bone Fertilizer	Dover	8 00	1 24	.70	1 94	2 36	4 08	21 01
Brands claiming										
9167	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Ammoniated Dissolved Bone Phosphate.	China Grove	9 06	1 22	.86	2 08	2 53	2 08	19 28
8894	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano.	Lumberton	9 04	.52	1 00	1 52	1 85	2 37	17 35

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.						Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	
MIXED FERTILIZERS.										
	Brand claiming			8.00			2.06	2.50	2.50	\$ 18.56
9122	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' All Crop Guano	Vanceboro	8.79	1.28	1.22	2.50	3.04	2.92	21.62
	Brands claiming			8.00			2.06	2.50	3.00	19.15
8984	Richmond Guano Co., Richmond, Va.	Tip Top Fertilizer	Shelby	8.17	1.42	.62	2.04	2.48	3.29	19.54
9155	Southern Cotton Oil Co., Goldsboro, N. C.	Echo	Plymouth	9.00	.46	1.66	2.12	2.58	3.35	20.69
8918	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Farmers' Alliance Guano.	Whiteville	8.97	.86	1.30	2.16	2.63	3.97	21.51
	Brands claiming			8.00			2.26	2.75	2.00	18.89
9047	Acme Mfg. Co., Wilmington, N. C.	Acme Cotton Grower	Goldsboro	9.57	.88	1.24	2.12	2.58	2.12	19.85
9045	Va.-Car. Chemical Co., Richmond, Va.	Best's Special Cotton Grower	Goldsboro	9.77	.50	1.82	2.32	2.82	2.19	20.94
	Brand claiming			8.00			2.26	2.75	2.50	19.44
8969	Hadley, Harris & Co., Wilson, N. C.	Hadley's Boss Guano	Wilson	8.36	.78	1.56	2.34	2.84	2.89	20.53
	Brand claiming			8.00			2.26	2.75	3.00	20.03
9103	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Favorite Cotton Grower	Fremont	8.42	.52	1.80	2.32	2.82	2.91	20.52
	Brands claiming			8.00			2.47	3.00	2.00	19.77
8846	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh Pacific Tobacco and Cotton Grower.	La Grange	8.99	1.08	1.36	2.44	2.97	2.32	20.89
8930	N. C. Cotton Oil Co., Wilmington, N. C.	Pate's Special	Wilmington	8.41	1.06	1.40	2.46	2.99	2.14	20.25

8802	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s L. and M. Special.	Raleigh	9.52	1.80	.74	2.54	3.09	2.84	22.36
	Brand claiming			8.00			2.47	3.00	2.50	20.32
8840	Va.-Car. Chemical Co., Richmond, Va.	Good Luck	Roseboro	8.06	.98	1.54	2.52	3.06	2.52	20.61
	Brands claiming			8.00			2.47	3.00	3.00	20.89
8811	Acme Mfg. Co., Wilmington, N. C.	Pee Dee Special Fertilizer	Cladborn	8.77	1.84	.64	2.48	3.02	3.29	21.93
8856	American Agricultural Chemical Co., New York, N. Y.	Lazaretto Special Tobacco and Potato Fertilizer.	Edenton	8.61	1.68	.86	2.54	3.09	3.28	22.02
8888	American Fertilizer Co., Norfolk, Va.	American Eagle Guano.	Shelby	9.92	1.54	.60	2.14	2.60	2.53	20.72
8831	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid High Grade Truck Guano.	Wadesboro	8.22	1.76	.84	2.60	3.16	3.42	22.08
9196	Clayton Oil Mill, Clayton, N. C.	Clayton Guano.	Clayton	8.77	.50	1.62	2.12	2.58	3.03	20.13
9037	Columbia Guano Co., Norfolk, Va.	Olympia Cotton Guano.	Ayden	9.56	.88	1.36	2.24	2.72	3.32	21.66
8924	Cooper Guano Co., Wilmington, N. C.	Cooper's Lenox	Wilmington	8.34	1.88	.68	2.56	3.11	3.33	21.92
8819	Farmers Cotton Oil Co., Wilson, N. C.	Golden Gem Guano	Selma	8.29	1.00	1.56	2.56	3.11	3.72	22.30
8833	Farmers Guano Co., Raleigh, N. C.	Golden Grade Guano.	Kinston	7.20	1.16	1.30	2.46	2.99	4.53	21.79
8822	Floradora Guano Co., Lynchburg, Va.	Osceola	Fayetteville	8.87	.96	1.44	2.40	2.92	3.89	22.34
9113	Fremont Oil Mill Co., Fremont, N. C.	Fremont Standard Fertilizer	Fremont	8.56	1.12	1.28	2.40	2.92	3.28	21.39
8943	Hampton Guano Co., Norfolk, Va.	Princess Prolific Producer	Clinton	8.22	1.86	.66	2.52	3.06	3.46	21.79
9054	Imperial Guano Co., Norfolk, Va.	X. L. O.	Tarboro	8.57	1.78	.80	2.58	3.14	3.37	21.84
8822	Interstate Chemical Corporation, Charleston, S. C.	Honest Queen High Grade Guano.	Rockingham	8.17	1.22	1.26	2.48	3.02	3.16	21.24
8891	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	Silver Dollar	Lumberton	8.25	1.20	1.64	2.84	3.45	3.85	23.59
9176	MacMurphy Co., Charleston, S. C.	Special Cotton and Corn Guano	Cerro Gordo	8.53	.94	1.92	2.86	3.48	3.33	23.35
8812	Martin, D. B., Co., Richmond, Va.	Martin's Bull Head Fertilizer for Cotton and Tobacco.	New Bern	8.25	1.46	.76	2.22	2.70	3.00	20.05
8834	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Guano.	Rockingham	8.43	1.52	1.24	2.76	3.36	3.75	23.30
8927	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington High Grade Guano	Wilmington	8.24	.88	1.60	2.48	3.02	3.53	21.71
9166	N. C. Cotton Oil Co., Charlotte, N. C.	Dixie Standard Fertilizer	Lincolnton	8.03	1.08	1.36	2.44	2.97	3.04	20.82
9216	Norfolk Fertilizer Co., Norfolk, Va.	Oriana for Cotton	Mount Gilkead	8.52	1.70	.66	2.36	2.87	3.36	21.28
8848	Pamlico Chemical Co., Washington, N. C.	Success Guano	Bayboro	8.55	1.08	1.76	2.84	3.45	3.86	23.87

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Equivalent to Ammonia.	Total Nitrogen.	Total Potash.	Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.					
				8.00			2.47	3.00	3.00	2.47	3.00	\$ 20 89
MIXED FERTILIZERS.												
	Brands claiming											
9217	Patapsco Guano Co., Baltimore, Md.	Choctaw Guano	Sanford	8.16	1.56	.88			2.44	2.56	2.42	20 25
8871	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont High Grade Ammoniated Bone and Potash	Wadesboro	8.07	1.40	1.16			3.11	3.45		21.81
9115	Pine Level Oil Mill Co., Pine Level, N. C.	Pine Level High Grade Fertilizer	Pine Level	8.41	.78	1.40			2.18	2.65	3.48	20 55
8852	Powhatan Chemical Co., Richmond, Va.	P. C. Co.'s Hustler	LaGrange	8.19	1.40	1.12			3.06	3.33		21.02
8905	Pocomoke Guano Co., Norfolk, Va.	Harvey's High Grade Monarch	Edenton	8.57	1.94	.70			3.21	3.09		22 20
8836	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer	Rockingham	8.02	1.52	1.06			3.14	3.19		21 56
9169	Rowan Chemical Co., Salisbury, N. C.	Rowan Double Header Guano	Norwood	8.04	1.70	.82			3.06	3.02		21 14
9033	Southern Cotton Oil Co., Goldsboro, N. C.	Edgerton's Old Reliable	Gritton	8.63	.58	1.92			3.04	3.71		22 35
8933	Southern Exchange Co., Maxton, N. C.	Comet Cotton Compound	Wilmington	8.14	1.96	.64			3.16	3.46		22 05
8971	do.	Jack's Best Fertilizer	Maxton	8.08	1.90	.70			3.16	3.49		22 03
9009	Swift Fertilizer Works, Wilmington, N. C.	Swift's Ruralist High Grade Guano	Burgaw	9.03	1.59	.87			2.99	3.25		22 03
8872	Union Guano Co., Winston, N. C.	Union Homestead Guano	Wadesboro	9.57	1.34	1.04			2.89	3.21		22 14
9043	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Guano	Faison	8.71	1.72	.84			3.11	4.51		23 55
8797	do.	Blake's Best	Raleigh	8.29	1.30	1.18			3.02	3.35		21 56
8915	do.	Diamond C. S. M. Guano	Whiteville	8.14	1.08	1.36			2.97	3.45		21 37

8899	do.	Durham Fertilizer Co.'s Gold Medal Brand Guano.	Rockingham.	10.57	.86	1.40	2.26	2.75	3.63	23.00
8919	do.	Norfolk and Carolina Chem. Co.'s Amazon High Grade Manure.	Whiteville.	8.75	.74	1.30	2.04	2.48	3.24	20.06
9007	do.	Old Dominion Guano Co.'s Farmers' Friend H. G. Fertilizer.	Wallace.	8.83	1.78	.66	2.44	2.97	3.42	21.96
9179	do.	Va. State Fertilizer Co.'s Bull Dog Guano.	Mount Tabor.	8.51	1.64	.76	2.40	2.92	3.39	21.47
	Brands claiming			8.00			2.47	3.00	4.00	21.97
8932	N. C. Cotton Oil Co., Wilmington, N. C.	Bullock's Cotton Grower.	Wilmington.	8.10	1.14	1.66	2.80	3.40	4.20	23.67
9066	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s Groom's Special Fertilizer.	Warsaw.	8.82	1.84	.62	2.46	2.99	4.01	22.68
8955	do.	Farmers' Success.	Lumberton.	9.05	1.98	.58	2.56	3.11	4.19	23.50
	Brand claiming			8.00			2.47	3.00	5.00	23.07
9106	Patapasco Guano Co., Baltimore, Md.	Patapasco Plant Food.	Fremont.	8.70	2.08	.14	2.82	3.43	5.32	25.53
	Brand claiming			8.00			2.47	3.00	10.00	28.57
8912	Baugh & Sons Co., Norfolk, Va.	Baugh's Fruit and Berry Guano.	Chadbourn.	8.04	1.52	1.06	2.58	3.14	10.00	29.07
	Brands claiming			8.00			3.29	4.00	4.00	25.42
8945	Acme Mfg. Co., Wilmington, N. C.	Quickstep Fertilizer.	Roseboro.	7.57	1.60	1.62	3.22	3.91	4.46	26.24
8932	Arps, G. L., Norfolk, Va.	Arps' Go-a-Head Guano for Truck, Cotton and Tobacco.	Roper.	8.80	2.54	.66	3.20	3.89	3.98	25.74
8913	Baugh & Sons Co., Norfolk, Va.	Baugh's Fish, Bone and Potash.	Chadbourn.	8.59	2.08	1.24	3.32	4.04	4.10	26.18
8958	Bryant Fertilizer Co., Alexandria, Va.	Bryant's High Grade Guano.	Lumberton.	8.12	1.24	2.14	3.38	4.11	4.04	25.95
9121	Craven Chemical Co., New Bern, N. C.	Hanover Standard Guano.	Richland.	8.69	2.60	.88	3.48	4.23	3.60	26.40
8979	Farmers Guano Co., Raleigh, N. C.	Farmers' Blood and Bone.	Everetts.	8.74	1.90	.78	2.68	3.23	4.63	24.21
8811	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Noxall.	New Bern.	8.63	2.00	.98	2.98	3.62	3.50	23.59
9053	Imperial Guano Co., Norfolk, Va.	Snowflake Cotton Grower.	Tarboro.	8.82	2.32	1.04	3.36	4.09	4.03	26.48
8892	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	Gold Dollar.	Lumberton.	8.39	1.06	1.84	2.90	3.53	4.66	24.86
9175	MacMurphy Co., Charleston, S. C.	Special Cotton Guano.	Cerro Gordo.	9.40	1.84	1.62	3.46	4.21	4.34	27.77
8814	Martin, D. B., Co., Richmond, Va.	Martin's Red Star Brand Fertilizer.	New Bern.	8.17	3.26	.22	3.48	4.23	4.97	27.43
9046	do.	do.	Goldshoro.	9.04	2.70	.24	2.94	3.57	3.92	24.80

ANALYSES OF COMMERCIAL FERTILIZERS. SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.		Total Potash.
MIXED FERTILIZERS.										
Brands claiming										
8896	Navassa Guano Co., Wilmington, N. C.	Navassa Special Truck Guano	Lumberton	8.00	1.30	1.94	3.29	4.00	4.00	\$ 25.42
8833	do	do	Rockingham	8.25	1.54	1.36	3.24	3.94	3.94	25.37
8931	N. C. Cotton Oil Co., Wilmington, N. C.	Bullock's High Grade Guano	Wilmington	9.38	1.60	1.62	2.90	3.53	3.12	24.05
8885	Ober, G., & Sons Co., Baltimore, Md.	Ober's High Grade Fertilizer	Kinston	8.13	2.24	1.06	3.22	3.91	4.85	26.17
9104	Patapsco Guano Co., Baltimore, Md.	Patapsco Cotton and Tobacco Special	Fremont	8.17	2.30	.98	3.30	4.01	4.92	26.62
9126	Pocomoke Guano Co., Norfolk, Va.	Faultless Ammoniated Superphosphate	Dover	8.47	2.54	.90	3.44	4.18	4.23	26.72
8886	Powhatan Chemical Co., Richmond, Va.	North State Special	Kinston	8.17	2.24	1.06	3.30	4.01	4.92	26.62
9076	Royster, F. S., Guano Co., Norfolk, Va.	Truckers' Delight	Gold-sboro	9.16	2.70	.70	3.40	4.13	4.41	27.37
9051	Southern Cotton Oil Co., Rocky Mount, N. C.	Southern Cotton Oil Co.'s Special Mixture	Tarboro	8.36	1.18	1.52	2.70	3.28	6.27	25.76
8970	Southern Exchange Co., Maxton, N. C.	Two Fours Guano	Maxton	8.22	1.12	1.24	3.36	4.09	4.36	26.31
8837	Swift Fertilizer Works, Atlanta, Ga.	Swift's Monarch High Grade Guano	Rockingham	8.64	1.38	1.88	3.26	3.96	3.73	25.57
8917	Va.-Car. Chemical Co., Richmond, Va.	Carr's 8-4-4 Crop Grower	Whiteville	8.92	1.10	1.90	3.00	3.65	4.49	25.57
9107	do	V.-C. C. Co.'s Farmers' Choice	Fremont	8.23	1.12	1.94	3.06	3.72	4.40	25.10
Brand claiming										
8820	Farmers Cotton Oil Co., Wilson, N. C.	Dean's Special Guano	Selma	8.00	2.46	2.02	3.70	4.50	7.00	30.44
				7.40			4.48	5.45	8.21	34.51

	Brand claiming		8.50		1.85	2.09	2.00	18.78
9127	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Superphosphate.	8.94	1.10	.54	1.99	2.03	17.17
89	Brand claiming		9.00			1.00	3.00	14.84
	Patapasco Guano Co., Baltimore, Md.	Coon Brand Guano.	9.72	.54	.38	1.12	2.81	15.70
8985	Brand claiming		9.00			1.65	1.00	16.13
9039	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Guano.	9.24	.94	.72	1.66	1.14	16.54
8845	Brands claiming		9.00			1.65	2.00	18.33
	Graven Chemical Co., New Bern, N. C.	Prolix Special Guano.	8.61	.70	.94	1.84	3.34	18.31
9005	Navassa Guano Co., Wilmington, N. C.	Oseola Guano	9.40	1.14	.56	1.70	2.07	18.45
9023	Brand claiming		9.00			1.85	2.25	20.27
	Hampton Guano Co., Norfolk, Va.	Arlington Animal Bone Fertilizer.	9.22	1.30	.68	1.98	2.41	20.99
8976	Brands claiming		9.00			2.26	2.75	19.79
	Imperial Co., Norfolk, Va.	Martin County Special Crop Grower.	9.80	1.40	1.00	2.40	2.03	21.13
8870	MacMurphy Co., Charleston, S. C.	Wilcox, Gibbs & Co.'s Manipulated Guano	9.40	.90	1.60	2.50	3.04	21.73
9238	do.	do.	9.30	.64	2.06	2.70	3.28	22.44
8928	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Prolific Crop Grower.	9.17	1.04	1.38	2.42	2.94	21.27
8967	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Meal Mixture	9.14	.76	1.62	2.38	2.89	20.98
9156	Southern Cotton Oil Co., Goldsboro, N. C.	Goldsboro Cotton Grower.	8.07	.48	1.84	2.32	2.82	19.73
9073	Union Guano Co., Winston, N. C.	Union Perfect Cotton Grower.	9.02	.82	1.28	2.10	2.55	19.24
9044	Va.-Car. Chemical Co., Richmond, Va.	Prolific Cotton Grower.	9.75	.48	1.90	2.38	2.89	21.17
8975	do.	White Stem.	9.75	.46	1.56	2.18	2.65	20.41
9199	Brand claiming		9.00			2.08	2.50	22.25
	Patapasco Guano Co., Baltimore, Md.	Patapasco Cotton and Corn Special	9.10	1.38	.60	1.98	2.41	22.46
8987	Brand claiming		9.00			2.47	3.00	21.77
	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special High Grade Fertilizer.	10.55	1.78	.68	2.46	2.99	23.18

ANALYSES OF COMMERCIAL FERTILIZERS - SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.						
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Relative Value per Ton at Factory.
MIXED FERTILIZERS.										
Brand claiming										
8824	Va.-Car. Chemical Co., Richmond, Va.	N. and R.'s Best.	Selma	9.00	2.10	.54	2.47	3.00	3.00	\$ 21.77
Brand claiming										
9191	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Durham High Grade.	Pinetop	9.00	2.64	.56	3.29	4.00	4.00	26.32
Brand claiming										
9003	Patapasco Guano Co., Baltimore, Md.	Patapasco Guano.	Mooreville	9.25			2.06	2.50	2.00	19.18
Brand claiming										
9143	American Fertilizer Co., Norfolk, Va.	Stable Manure Substitute	Dunn	7.00	1.36	.58	1.94	2.36	2.54	19.76
Brand claiming										
9025	American Fertilizer Co., Norfolk, Va.	American Fish Scrap Guano.	Greenville	7.72	1.30	.80	2.47	3.00	4.00	21.07
Brands claiming										
8859	Baugh & Sons Co., Norfolk, Va.	Glover's Special Potato Guano.	Elizabeth City	7.00	1.00	2.22	3.29	4.00	3.79	19.15
9158	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Pasquotank Trucker South Mills		7.07			3.22	3.91	4.00	24.52
Brands claiming										
9159	American Fertilizer Co., Norfolk, Va.	American Irish Potato Grower	Elizabeth City	7.00			3.29	4.00	8.00	24.05
8902	Pamlico Chemical Co., Washington, N. C.	Pamlico Favorite Potato Guano.	Washington	8.51	2.52	.98	3.50	4.26	7.89	28.96
9055	Patapasco Guano Co., Baltimore, Md.	Patapasco Trucker for Early Vegetables.	Bethel	7.53	2.74	.64	3.38	4.11	8.45	31.04
Brands claiming										
9159	American Fertilizer Co., Norfolk, Va.	American Irish Potato Grower	Elizabeth City	7.00			4.12	5.00	5.00	30.27
8902	Pamlico Chemical Co., Washington, N. C.	Pamlico Favorite Potato Guano.	Washington	7.12	3.22	1.46	4.68	5.69	5.11	29.10
9055	Patapasco Guano Co., Baltimore, Md.	Patapasco Trucker for Early Vegetables.	Bethel	8.14	1.80	2.48	4.28	5.20	6.19	31.68
Brands claiming										
9055	Patapasco Guano Co., Baltimore, Md.	Patapasco Trucker for Early Vegetables.	Bethel	7.80	3.04	1.14	4.18	5.08	5.07	32.11
Brands claiming										
9055	Patapasco Guano Co., Baltimore, Md.	Patapasco Trucker for Early Vegetables.	Bethel	7.80	3.04	1.14	4.18	5.08	5.07	30.15

8907	Pocomoke Guano Co., Norfolk, Va.	Standard Truck Guano	Hertford	7.55	3.24	1.10	4.34	5.28	5.28	30.83
9052	Royster, F. S., Guano Co., Norfolk, Va.	Royal Potato Guano	Bethel	7.39	3.08	1.00	4.08	4.96	5.53	29.87
Brands claiming										
9093	American Fertilizer Co., Norfolk, Va.	Special Potato Guano	Lumberton	7.75	1.92	1.76	3.68	4.47	5.03	23.76
8835	Navassa Guano Co., Wilmington, N. C.	Navassa Root Crop Fertilizer	Rockingham	8.55	1.72	1.80	3.52	4.28	5.60	28.64
8951	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Ives' Irish Potato Guano	Plymouth	8.84	3.04	1.40	4.44	5.40	7.07	34.38
Brands claiming										
9157	Imperial Co., Norfolk, Va.	High Grade Irish Potato Guano	Camden	7.27	2.40	1.72	4.12	5.00	7.78	32.40
8818	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Great Potato Guano	New Bern	8.19	2.02	1.19	3.12	3.79	6.11	27.18
Brand claiming										
8817	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Great Cabbage Guano	New Bern	7.00	4.52	1.34	5.86	7.12	7.73	39.23
Brand claiming										
8920	Va.-Car. Chemical Co., Richmond, Va.	Tinsley & Co.'s Strawberry Grower	Whiteville	6.00	1.36	2.10	3.29	4.00	4.00	23.62
Brands claiming										
8948	Imperial Co., Norfolk, Va.	Williams' Special Potato Guano	Hertford	6.22	2.34	1.60	3.94	4.79	5.11	27.77
9206	Young, J. R., Fertilizer Co., Norfolk, Va.	Young's Special Guano for Potatoes	Elizabeth City	6.13	2.80	1.26	4.06	6.03	5.25	28.34
Brands claiming										
9154	Baltimore Fertilizer Co., Baltimore, Md.	Honest Dixie Trucker	Belcross	6.91	2.92	1.20	4.12	5.01	6.85	31.06
8857	Baugh & Sons Co., Norfolk, Va.	Baugh's Peruvian Guano Substitute for Potatoes and all Vegetables	Hertford	6.44	3.30	.88	4.18	5.08	7.28	31.36
8860	Eastern Cotton Oil Co., Hertford, N. C.	Non-Such Potato Fertilizer	Elizabeth City	8.05	1.00	2.24	3.94	4.67	7.84	32.00
9201	Martin, D. B., Co., Richmond, Va.	Martin's Annual Bone Potato Guano	Elizabeth City	6.91	2.52	1.44	3.96	4.81	7.52	30.94
8862	Miller Fertilizer Co., Baltimore, Md.	High Grade Potato Fertilizer	Elizabeth City	6.30	3.00	1.16	4.16	5.06	6.98	30.82
Brand claiming										
8901	Mapes Formula and Peruvian Guano Co., New York, N. Y.	Mapes' Vegetable Manure	Washington	6.71	4.66	.60	5.26	6.40	7.96	36.89
Brand claiming										
9053	Baugh & Sons Co., Norfolk, Va.	Baugh's 7 Per Cent Potato Guano High Point		6.49	4.72	1.08	5.80	7.05	5.66	36.43

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Total Potash.	Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.			
MIXED FERTILIZERS.											
Brands claiming				5.00			8.25	10.00	2.50	\$ 41.90	
8807	Craven Chemical Co., New Bern, N. C.	Craven Chemical Co.'s Truck Guano.	Vanceboro.	6.43	4.40	2.18	8.58	8.00	2.54	36.22	
8849	Pamlico Chemical Co., Washington, N. C.	Cowell's Great Cabbage Grower.	Washington.	5.97	5.92	2.50	8.42	10.24	3.82	44.94	
Brand claiming				4.00			3.29	4.00	4.00	21.86	
9014	Armour Fertilizer Works, Wilmington, N. C.	Armour's Harvey's Special Fertilizer.	Wallace.	4.21	2.00	1.34	3.34	3.94	4.11	22.34	
Brand claiming				12.00			1.65	2.00		17.73	
9016	Home Fertilizer and Chemical Co., Baltimore, Md.	Boykin's Dissolved Animal Bone.	Wallace.	13.21			1.64	1.99		18.78	
Brands claiming				10.00					2.00	11.20	
8292	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Cherryville.	10.09					1.66	10.91	
90089	Union Guano Co., Winston, N. C.	Union Bone and Potash.	Lexington	10.64					2.41	11.69	
8994	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Mammoth Corn Grower.	Salisbury	10.87					1.70	11.65	
Brands claiming				10.00					4.00	13.40	
9163	Berkley Chemical Co., Norfolk, Va.	Berkley Plant Food.	Mackey's Ferry	10.36					3.96	13.68	
9147	Swift Fertilizer Works, Wilmington, N. C.	Swift's Farmers' Home High Grade Phosphate and Potash.	Clarkton	10.15					3.71	13.21	
8995	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Special Potash Mixture.	Moorestville.	10.07					2.93	12.28	
Brand claiming				10.00					5.00	14.50	
8804	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s Alpine Mixture.	Raleigh.	11.57					4.16	14.99	

8803	Brand claiming Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Quick- step Bone and Potash.	Raleigh.	11.00	5.00	15.40
	Brand claiming			10.92	6.20	16.65
9017	Home Fertilizer and Chemical Co., Balti- more, Md.	Home Fertilizer	Wallace.		5.76 7.00	31.93
					7.84 9.53	41.95

RAW OR UNMIXED FERTILIZER MATERIALS.

	Brands claiming			13.00		10.40
9186	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone.	Whiteville	13.92		11.14
9000	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Double Bone Phosphate.	Salisbury.	16.50		13.20
8803	do.	Durham Fertilizer Co.'s Double Bone, Extra Strong.	Raleigh.	14.73		11.78
	Brands claiming			14.00		11.20
8826	Acme Mfg. Co., Wilmington, N. C.	Acme High Grade Acid Phosphate	Fayetteville	14.43		11.54
9029	American Fertilizing Co., Norfolk, Va.	High Grade Acid Phosphate.	Charlotte.	12.85		10.28
9161	Arps, Geo. L., & Co., Norfolk, Va.	Arps' 14 Per Cent Acid Phosphate.	Edenton.	15.29		12.23
8899	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Acid Phos- phate.	Lumberton.	14.56		11.65
8827	Farmers Guano Co., Richmond, Va.	14 Per Cent Acid Phosphate.	Mount Gilead	14.99		11.99
9033	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's 14 Per Cent Acid Phos- phate.	Ayden.	15.72		12.53
8828	Martin, D. B., Co., Richmond, Va.	Martin's Acid Phosphate.	Fayetteville.	14.49		11.39
9130	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Diamond Acid Phos- phate.	Vanceboro	14.48		11.53
9039	Mewborn, T. W., & Co., Kingston, N. C.	14 Per Cent Acid Phosphate.	Kingston.	11.80		11.84
8900	Navassa Guano Co., Wilmington, N. C.	Navassa Acid Phosphate, 14 Per Cent.	Lumberton.	14.98		11.98
9131	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	14 Per Cent Acid Phosphate.	Richland.	14.69		11.75
8881	Nitrate Agencies Co., New York, N. Y.	High Grade Acid Phosphate.	Williamston.	14.47		11.53
9192	do.	do.	Williamston.	14.22		11.36
9063	Patapsco Guano Co., Baltimore, Md.	Patapsco Pure Dissolved S. C. Phosphate.	Henderson.	14.42		11.54

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.		Total Potash.
RAW OR UNMIXED FERTILIZER MATERIALS.									
Brands claiming				14 00					\$ 11 20
9026	Richmond Guano Co., Richmond, Va.	High Grade Acid Phosphate.	Washington	14 14					11.31
9111	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate.	Henderson	14.20					11.36
8961	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate.	Lumberton	13 54					10 83
9145	Swift Fertilizer Works, Wilmington, N. C.	Swift's Cultivator High Grade Acid Phosphate.	Clarkton	13 65					10 92
8874	Union Guano Co., Winston, N. C.	Union High Grade Acid Phosphate.	Wadesboro	14 79					11.83
8876	Union Abattoir Co., Baltimore, Md.	Acid Phosphate	Wadesboro	14 46					11 57
8878	Va.-Car. Chemical Co., Richmond, Va.	Norf. and Car. Chem. Co.'s Norfolk Reliable Acid Phosphate.	Wadesboro	11.94					9 55
Brands claiming				18 00					12 80
9165	American Agricultural Chemical Co., New York, N. Y.	16 Per Cent Superphosphate	Mackey's Ferry	16.01					12.81
8864	Baugh & Sons Co., Philadelphia, Pa.	Baugh's 16 Per Cent Acid Phosphate.	Elizabeth City	16.02					13.30
8965	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	16 Per Cent Acid Phosphate.	Fayetteville	16.45					13 16
9051	Contentnea Guano Co., Wilson, N. C.	Special Formula Fertilizer.	Mount Olive	15 67					12 54
9144	Cooper Guano Co., Wilmington, N. C.	Cooper's 16 Per Cent Acid Phosphate.	Wilmington	16.22					12 98
9162	Eastern Cotton Oil Co., Hertford, N. C.	16 Per Cent Acid Phosphate.	Edenton	16 04					12 83
9090	Farmers Guano Co., Raleigh, N. C.	do	Siler City	16.72					13.37

9119	Fremont Oil Mill Co., Fremont, N. C.	do.	Fremont	16 42	13 14
9050	Martin, D. B., Co., Richmond, Va.	Martin's Acid Phosphate	Goldsboro	16 46	13 17
9080	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Diamond Acid Phosphate.	Goldsboro	16 04	12 83
9040	Mewborn, T. W., & Co., Kinston, N. C.	16 Per Cent Acid Phosphate	Kinston	16 45	13 16
9219	Navassa Guano Co., Wilmington, N. C.	Navassa 16 Per Cent Acid Phosphate.	Racford	16 67	13 34
8910	Pamlico Chemical Co., Washington, N. C.	Pamlico 16 Per Cent Acid Phosphate.	Washington	16 33	13 06
9218	Patapsco Guano Co., Baltimore, Md.	Florida Soluble Phosphate	Sanford	16 27	13 02
8900	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate	Shelby	16 00	12 80
9173	Rowan Chemical Co., Salisbury, N. C.	Rowan 16 Per Cent Acid Phosphate.	Salisbury	16 40	13 12
8991	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 16 Per Cent Acid Phosphate.	Cherryville	15 82	12 66
8937	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate	Wilmington	16 27	13 02
8806	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate.	Raleigh	16 01	12 81
9172	do.	Durham Fertilizer Co.'s Durham Best Acid Phosphate.	Norwood	16 70	13 36
8923	do.	Va.-Car. Chemical Co.'s 16 Per Cent Acid Phosphate.	Whiteville	16 35	13 08
9211	Winborne-Brown Guano Co., Norfolk, Va.	High Grade Acid Phosphate	Waddell	16 00	12 80
Brands claiming					
8825	Acme Mfg. Co., Wilmington, N. C.	Pure German Kainit	Fayetteville		12 00 12 00
8993	American Fertilizing Co., Norfolk, Va.	Genuine German Kainit	Shelby		12 86 12 86
9048	Best, M. J., & Sons, Goldsboro, N. C.	Pure German Kainit	Goldsboro		13 10 13 10
9095	Coe-Mortimer Co., Charleston, S. C.	German Kainit	Simpson		12 92 12 92
9079	German Kali Works, Baltimore, Md.	do.	Faison		12 12 12 12
8840	do.	do.	Rockingham		12 94 12 94
9041	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Pure German Kainit	Ayden		12 70 12 70
8841	John, J. T., John's Station, N. C.	Genuine German Kainit	Laurinburg		14 40 14 40
8877	Leak & Marshall, Wadesboro, N. C.	Pure German Kainit	Wadesboro		13 00 13 00
					13 16 13 16

	Brand claiming					49 00	49 00
8935	Southern Exchange Co., Maxton, N. C.	do.	Williamston			50 03	50 03
	Brands claiming					50 00	50 00
9180	Cooper, W. B., Wilmington, N. C.	Muriate of Potash	Fairmont			50 48	50 48
8869	German Kali Works, Baltimore, Md.	do.	Laurinburg			50 10	50 10
8982	Nitrate Agencies Co., New York, N. Y.	do.	Williamston			50 27	50 27
	Brand claiming					8 24	10 00
9015	Va.-Car. Chemical Co., Richmond, Va.	Dried Fish Scrap	Wallace			8 84	10 75
	Brand claiming					9 05	11 00
8830	Parsons & Hardison, Wadesboro, N. C.	High Grade Ground Tankage	Mount Gilead			8 94	10 87
	Brand claiming					13 18	16 00
9098	Coe-Mortimer Co., Charleston, S. C.	Dried Blood	Simpson			13 10	15 93
	Brands claiming					14 80	18 00
8962	American Fertilizing Co., Norfolk, Va.	Nitrate of Soda	Lumberton			15 23	18 52
8829	Grace, W. R. & Co., New York, N. Y.	do.	Fayetteville			15 20	18 48
8936	N. C. Cotton Oil Co., Wilmington, N. C.	do.	Wilmington			15 22	18 30
8865	Peruvian Guano Corporation, Charleston, S. C.	do.	Edenton			15 27	18 57
8963	Va.-Car. Chemical Co., Richmond, Va.	do.	Fayetteville			15 04	18 29
8879	Wessell, Duval & Co., New York, N. Y.	do.	Wadesboro			15 25	18 54
	Brands claiming					14 85	18 05
9185	Cooper, W. B., Wilmington, N. C.	Nitrate of Soda	Fairmont			15 40	18 72
9138	Grace, W. R. & Co., New York, N. Y.	do.	Rae ford			15 40	18 72
	Brands claiming					15 00	18 24
9097	Coe-Mortimer Co., Charleston, S. C.	Nitrate of Soda	Simpson			15 07	18 32
9240	Pocomoke Guano Co., Norfolk, Va.	do.	Clarkton			15 23	18 52
9146	Southern Exchange Co., Maxton, N. C.	do.	Wilmington			15 04	18 29

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water- soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.		Total Potash.
RAW OR UNMIXED FERTILIZER MATERIALS.									
Brand claiming									
8865	Baugh & Sons Co., Norfolk, Va.	Nitrate of Soda	Elizabeth City				15.22	18.50	\$ 59.35
Brands claiming									
9290	Clayton Oil Mill, Clayton, N. C.	Nitrate of Soda	Clayton				15.40	18.72	59.60
9120	Richmond Guano Co., Richmond, Va.	do.	Pine Level				15.65	19.03	61.11
9212	Winborne-Brown Guano Co., Norfolk, Va.	do.	Waddell				15.63	19.00	60.96
							15.37	18.69	59.94
							15.30	18.60	59.67

II. BRANDS REGISTERED, SEASON 1910-1911.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Raw Bone Meal.....Total	20.25	3.71	....
Atlantic High Grade 16 Per Cent Acid Phosphate	16.00	....	....
Atlantic 14 Per Cent Acid Phosphate.....	14.00	....	....
Atlantic Dissolved Bone.....	13.00	....	....
Atlantic Acid Phosphate.....	12.00	....	....
Atlantic 10 and 5 Bone and Potash Mixture..	10.00	....	5.00
Atlantic 10 and 4 Bone and Potash Mixture..	10.00	....	4.00
Atlantic Bone and Potash for Grain.....	10.00	....	3.00
Atlantic Bone and Potash Mixture.....	10.00	....	2.00
Atlantic Meal Compound.....	9.00	2.27	2.00
Atlantic Cotton Grower.....	9.00	2.06	1.00
Corona Cotton Compound.....	9.00	1.65	3.00
Atlantic Special Guano.....	9.00	1.65	1.00
Atlantic Special Truck Guano.....	8.00	3.30	4.00
Oriental High Grade Guano.....	8.00	3.30	4.00
Paloma Tobacco Guano.....	8.00	3.30	4.00
Boon's Special Guano.....	8.00	2.47	4.00
Atlantic High Grade Tobacco Guano.....	8.00	2.47	3.00
Atlantic High Grade Cotton Guano.....	8.00	2.47	3.00
Atlantic Tobacco Grower.....	8.00	2.06	3.00
Atlantic Tobacco Compound.....	8.00	2.06	2.00
Atlantic Special Wheat Fertilizer.....	8.00	1.65	2.00
Atlantic Soluble Guano.....	8.00	1.65	2.00
Apex Peanut Grower.....	8.00	1.02	4.00
Atlantic 8 and 5 Bone and Potash Mixture..	8.00	....	5.00
Atlantic 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Atlantic 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Atlantic Potato Guano.....	7.00	4.12	5.00
Perfection Peanut Grower.....	7.00	....	5.00
Atlantic Side Dresser.....	4.00	8.22	4.00
Atlantic Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Atlantic Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>Geo. L. Arps & Co., Norfolk, Va.—</i>			
Arps' 11. G. 16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Arps' 10 and 2 Bone and Potash Mixture....	10.00	....	2.00
Arps' "Go-a-Head" Guano for Trucks, Cotton and Tobacco	8.00	3.30	4.00
Arps' Tobacco Guano.....	8.00	2.47	3.00
Arps' Quick Growth for All Crops.....	8.00	2.47	3.00
Arps' Premium Guano for Cotton, Tobacco and All Spring Crops.....	8.00	1.65	2.00
Geo. L. Arps & Co.'s Big Yield Guano.....	8.00	1.65	2.00
Arps' Standard Truck Guano.....	7.00	4.12	5.00
Arps' Potato Guano.....	6.00	5.76	5.00
Arps' Scuppernong Guano for Trucks.....	6.00	4.12	7.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Atlantic Fertilizer Company, Atlanta, Ga.—</i>			
Atlantic "X" High Grade Acid Phosphate....	16.00	....	....
Atlantic "O" High Grade Acid Phosphate....	14.00	....	....
Atlantic "P" Standard Grade Acid Phosphate.	13.00	....	....
Atlantic "A" High Grade Guano.....	10.00	2.47	3.00
Atlantic "G" High Grade Guano.....	10.00	1.65	2.00
Atlantic "K" High Grade Phosphate and Potash	10.00	....	4.00
Atlantic "M" Standard Grade Phosphate and Potash	10.00	....	2.00
Atlantic "D" High Grade Guano.....	9.00	1.65	3.00
Atlantic "F" Cotton-seed Meal Comp. H. G..	9.00	1.65	3.00
Atlantic "B" High Grade Guano.....	8.00	3.29	4.00
Atlantic "C" High Grade Guano.....	8.00	2.47	3.00
Cutchin's King Cotton.....	8.00	2.47	3.00
Atlantic "E" Cotton-seed Meal Comp. H. G..	8.00	2.47	3.00
Atlantic "H" Standard Grade Guano.....	8.00	1.65	2.00
Atlantic "I" Standard Grade Guano.....	8.00	.82	4.00
Atlantic "L" Standard Grade Phosphate and Potash	8.00	....	4.00
Atlantic Nitrate of Soda.....	....	15.22	....
Atlantic Muriate of Potash.....	....	....	50.00
Atlantic Sulphate of Potash.....	....	....	49.00
Atlantic German Kainit.....	....	....	12.40

Acme Manufacturing Co., Wilmington, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Acme High Grade Acid Phosphate.....	14.00	....	....
Acme Acid Phosphate.....	13.00	....	....
Acme Bone and Potash.....	12.00	....	6.00
Acme Bone and Potash.....	12.00	....	5.00
Acme Bone and Potash.....	12.00	....	4.00
Acme Bone and Potash.....	12.00	....	3.00
Acme Bone and Potash.....	12.00	....	2.00
Acme Bone and Potash.....	11.00	....	6.00
Acme Bone and Potash.....	11.00	....	5.00
Acme Bone and Potash.....	11.00	....	4.00
Acme Bone and Potash.....	11.00	....	3.00
Acme Bone and Potash.....	11.00	....	2.00
Acme Bone and Potash.....	10.00	....	6.00
Acme Melon Grower.....	10.00	3.30	5.00
Acme Bone and Potash.....	10.00	....	5.00
Acme Bone and Potash.....	10.00	....	4.00
Acme Bone and Potash.....	10.00	....	3.00
Acme Bone and Potash.....	10.00	....	2.00
Acme Cotton Grower.....	9.00	2.27	2.00
Acme Special Fertilizer for Cotton.....	8.00	4.12	7.00
Acme Plumb Good Fertilizer.....	8.00	3.30	6.00
Acme "OK" Fertilizer.....	8.00	3.30	4.00
Acme "OK" Fertilizer for Tobacco.....	8.00	3.30	4.00
Quickstep Fertilizer	8.00	3.30	4.00
Quickstep Fertilizer for Tobacco.....	8.00	3.30	4.00
Acme Crop Grower.....	8.00	2.47	4.00
Currie's High Grade Fertilizer.....	8.00	2.47	4.00
Acme Crop Grower for Tobacco.....	8.00	2.47	4.00
Best's Fish Scrap Guano for Tobacco.....	8.00	2.47	3.00
Best's Fish Scrap Guano.....	8.00	2.47	3.00
Pee Dee Special Fertilizer.....	8.00	2.47	3.00
Pee Dee Special for Tobacco.....	8.00	2.47	3.00
Acme Plant Food.....	8.00	2.47	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Acme Fertilizer for Tobacco.....	8.00	2.47	2.50
Acme Fertilizer	8.00	2.47	2.50
Tiptop Crop Grower.....	8.00	2.06	3.00
Tiptop Tobacco Grower.....	8.00	2.06	3.00
Lattimer's Complete Fertilizer.....	8.00	2.06	2.00
Best's Complete Fertilizer.....	8.00	2.06	2.00
Cotton-seed Meal Guano.....	8.00	1.65	2.00
Gem Fertilizer	8.00	1.65	2.00
Cotton-seed Meal Guano for Tobacco.....	8.00	1.65	2.00
Gem Fertilizer for Tobacco.....	8.00	1.65	2.00
Acme Special Grain Fertilizer.....	8.00	1.65	2.00
Acme Bone and Potash.....	8.00	....	6.00
Acme Bone and Potash.....	8.00	....	5.00
Acme Bone and Potash.....	8.00	....	4.00
Acme Root Crop Guano.....	7.00	4.12	7.00
Acme Standard Truck Guano.....	7.00	4.12	5.00
Acme High Grade Guano.....	6.00	4.95	8.00
Acme Truck Grower.....	6.00	3.30	8.00
Acme Corn Guano.....	6.00	2.47	3.00
Dried Fish Scrap.....	4.50	8.02	....
Acme Special 4-10-4 Guano.....	4.00	8.25	4.00
Clark's Corn Guano.....	1.00	6.58	10.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.83	....
Ground Dried Blood.....	....	12.91	....
Acme Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	48.00
Muriate of Potash.....	....	....	48.00
High Grade German Kainit.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Ashepool Fertilizer Co., Charleston, S. C.—

High Grade Ashepool Dissolved Phosphate....	16.00	....	....
High Grade Ashepool Acid Phosphate.....	14.00	....	....
High Grade Ashepool XXXX Acid Phosphate....	14.00	....	....
High Grade Eutaw Acid Phosphate.....	14.00	....	....
Standard Ashepool XXX Acid Phosphate.....	13.00	....	....
Standard Ashepool Dissolved Bone.....	13.00	....	....
Standard Eutaw XXX Acid Phosphate.....	13.00	....	....
Standard Carolina Acid Phosphate.....	13.00	....	....
Standard Circle Bone	13.00	....	....
H. G. Ashepool Bone and Potash.....	12.00	....	2.00
Standard Ashepool Acid Phosphate and Potash..	12.00	....	1.00
Standard Eutaw Acid Phosphate and Potash..	12.00	....	1.00
Standard Eutaw XX Acid Phosphate.....	12.00	....	....
Standard Coomassie Acid Phosphate.....	12.00	....	....
Standard Ashepool XX Acid Phosphate.....	12.00	....	....
Standard Ashepool Potash and Acid Phosphate..	11.00	....	1.00
Standard Eutaw Potash Acid Phosphate.....	11.00	....	1.00
Standard Palmetto Potash Acid Phosphate... °	11.00	....	1.00
High Grade Ashepool Watermelon Guano.....	10.00	3.29	5.00
H. G. Ashepool Cantaloupe Guano.....	10.00	2.46	10.00
H. G. Ashepool Golden Fertilizer.....	10.00	1.65	2.00
Taylor's XX Ammoniated Dissolved Fertilizer	10.00	.82	1.00
H. G. Eutaw Superpotash Acid Phosphate.....	10.00	....	4.00
High Grade Ashepool Superpotash Acid Phos- phate	10.00	....	4.00
Standard Ashepool Potash Compound.....	10.00	....	3.00
Standard Enoree Acid Phosphate and Potash..	10.00	....	2.00
Standard Ashepool Wheat and Oats Specific..	9.50	1.65	1.00
Standard Ashepool Fertilizer.....	9.00	1.85	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Eutaw Fertilizer	9.00	1.85	1.00
High Grade Taylor's Circle Guano.....	9.00	1.65	4.00
Standard Ashepoo Harrow Brand Raw Bone Superphosphate	9.00	1.65	2.00
Standard Eutaw XXX Guano.....	9.00	1.65	2.00
Standard Ashepoo Guano.....	8.50	2.06	1.00
Standard Eutaw XX Guano.....	8.50	1.65	2.00
Standard Ashepoo XX Guano.....	8.50	1.65	2.00
High Grade Ashepoo Fruit Grower.....	8.00	3.91	2.75
High Grade Ashepoo Perfection Guano.....	8.00	3.29	6.00
High Grade Ashepoo Guano.....	8.00	3.29	4.00
High Grade Ashepoo Ammoniated Superphos- phate	8.00	2.46	4.00
High Grade Eutaw X Golden Fertilizer.....	8.00	2.46	4.00
High Grade Ashepoo Bird and Fish Guano....	8.00	2.46	3.00
High Grade Ashepoo Meal Mixture.....	8.00	2.46	3.00
High Grade Ashepoo X Tobacco Fertilizer...	8.00	2.46	3.00
High Grade Ashepoo Golden Tobacco Producer	8.00	2.46	3.00
High Grade Carolina XXX Guano.....	8.00	2.46	3.00
High Grade Eutaw Special Cotton-seed Meal Guano	8.00	2.46	2.00
High Grade Ashepoo Farmers' Special.....	8.00	2.06	3.00
Standard Eutaw Circle Guano.....	8.00	2.06	2.00
Standard Ashepoo Circle Guano.....	8.00	2.06	2.00
Standard Coomassie Circle Fertilizer.....	8.00	1.65	2.00
Standard Carolina Guano.....	8.00	1.65	2.00
Standard P. D. Fertilizer.....	8.00	1.65	2.00
Standard Ashepoo XXX Guano.....	8.00	1.65	2.00
Standard Ashepoo Special Fertilizer.....	8.00	1.65	2.00
Standard Bronwood Acid Phosphate.....	8.00	....	4.00
High Grade Ashepoo Truck Guano.....	7.00	4.12	5.00
High Grade Ashepoo Vegetable Guano.....	5.00	4.12	5.00
High Grade Ashepoo Nitrogenous Top Dress- ing	3.00	7.00	2.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	45.00
German Kainit .....	....	....	12.00

*The Armour Fertilizer Works, Atlanta, Chicago
and Wilmington—*

Armour's Raw Bone Meal.....Total	22.00	3.70	....
17 Per Cent Acid Phosphate.....	17.00	....	....
16 Per Cent Acid Phosphate.....	16.00	....	....
Star Phosphate	14.00	....	....
13 Per Cent Acid Phosphate.....	13.00	....	....
12 Per Cent Acid Phosphate.....	12.00	....	....
Sampson Corn Mixture.....	11.00	....	5.00
Fertilizer, No. 1044.....	10.00	3.30	4.00
Fertilizer, No. 1025.....	10.00	1.65	5.00
Shield Fertilizer, No. 1023.....	10.00	1.65	3.00
Ammoniated Dissolved Bone and Potash....	10.00	1.65	2.00
Phosphoric Acid and Potash.....	10.00	....	5.00
Superphosphate and Potash.....	10.00	....	4.00
M. H. White & Co.'s Special Corn Mixture...	10.00	....	2.00
Phosphate and Potash, No. 1.....	10.00	....	2.00
African Cotton Grower.....	9.00	2.47	3.00
Bone and Dissolved Bone with Potash.....	9.00	1.65	3.00
Fertilizer, No. 913.....	9.00	.82	3.00
Standard Cotton Grower.....	8.50	1.65	2.00
Bone, Blood and Potash.....	8.00	4.11	7.00
Van Lindley's Special	8.00	4.11	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Fertilizer, No. 846.....	8.00	3.30	6.00
Fertilizer, No. 844.....	8.00	3.30	4.00
Special Trucker	8.00	3.30	4.00
All Soluble	8.00	2.88	4.00
Truck and Berry Special.....	8.00	2.47	10.00
Underwood's Special	8.00	2.47	10.00
Fertilizer, No. 836.....	8.00	2.47	6.00
Fertilizer, No. 834.....	8.00	2.47	4.00
Underwood's Favorite	8.00	2.47	3.00
Cotton Special	8.00	2.47	3.00
Tobacco Special	8.00	2.47	3.00
Trucker's Special	8.00	2.47	3.00
Carolina Cotton Grower.....	8.00	2.47	2.00
Berry King	8.00	2.05	4.00
Gold Medal for Tobacco.....	8.00	2.05	3.00
Sweet Potato Special.....	8.00	2.05	3.00
Champion	8.00	2.05	2.50
King Cotton	8.00	2.05	2.00
High Grade Potato.....	8.00	1.65	10.00
Fruit and Root Crop Special.....	8.00	1.65	5.00
Carolina Cotton Special.....	8.00	1.65	3.00
Armour's Slaughter House Fertilizer.....	8.00	1.65	2.00
General	8.00	1.65	2.00
Fertilizer, No. 813.....	8.00	.82	3.00
Phosphate and Potash, No. 2.....	8.00	....	5.00
Phosphate and Potash, No. 3.....	8.00	....	4.00
7 Per Cent Trucker.....	6.00	5.76	5.00
5 Per Cent Trucker.....	6.00	4.11	7.00
Manure Substitute	6.00	3.30	4.00
10 Per Cent Trucker.....	5.00	8.24	3.00
Top Dresser	5.00	8.24	2.00
Special Formula for Tobacco.....	4.00	3.30	5.00
Harvey's Special	4.00	3.30	4.00
10 Per Cent Tankage.....	2.00	8.24	....
Nitrate of Soda.....	....	14.81	....
Dried Blood .....	....	13.16	....
Armour's Top Dresser.....	....	7.83	4.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

American Fertilizer Co., Norfolk, Va.—

Bone Meal	Total	22.50	3.71	....
American High Grade Acid Phosphate.....		16.00	....	....
High Grade Acid Phosphate.....		14.00	....	....
Eagle Brand Acid Phosphate.....		13.00	....	....
Double Extra Bone and Potash.....		12.00	....	5.00
Acid Phosphate		12.00	....	....
American Standard Cotton Grower.....		10.00	1.65	2.00
American Formula for Wheat and Corn.....		10.00	....	5.00
Double Dissolved Bone and Potash.....		10.00	....	4.00
Dissolved Bone and Potash for Corn and Wheat		10.00	....	2.00
Strawberry and Asparagus Guano.....		9.00	2.88	9.00
Pitt County Special Fertilizer.....		9.00	2.88	5.00
Special Formula Guano for Yellow Leaf To- bacco		9.00	2.88	5.00
American Bone Mixture.....		9.00	.83	2.00
Blood and Bone Compound.....		8.50	2.06	1.00
Peruvian Mixture		8.50	1.65	1.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Peruvian Mixture Guano Especially Prepared for Sweet Potatoes.....	8.00	3.29	5.00
N. C. and S. C. Cotton Grower.....	8.00	3.29	4.00
American Nonpareil Tobacco Grower.....	8.00	3.29	4.00
American Eagle Guano.....	8.00	2.47	3.00
J. G. Miller & Co.'s Yellow Leaf Fertilizer....	8.00	2.47	3.00
American No. 1 Fertilizer.....	8.00	2.06	3.00
Bob White Fertilizer for Tobacco.....	8.00	2.06	1.50
A. L. Hanna's Special.....	8.00	1.65	2.00
American No. 2 Fertilizer.....	8.00	1.65	2.00
American Special Potash Mixture for Wheat.	8.00	....	4.00
10 Per Cent Ammoniated Guano.....	7.00	8.24	2.50
American 7-7-7 for Irish Potatoes.....	7.00	5.76	7.00
Standard 7 Per Cent Ammonia Guano.....	7.00	5.76	5.00
Special Potato Guano.....	7.00	4.12	7.00
Kale, Spinach and Cabbage Guano.....	7.00	4.12	4.00
American Fish Scrap Guano.....	7.00	3.29	4.00
Stable Manure Substitute.....	7.00	2.47	4.00
Special Potato Manure.....	6.00	4.12	7.00
Nitrate of Soda.....	....	14.83	....
Ground Fish Scraps.....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*American Agricultural Chemical Co., Baltimore
and New York—*

Fine Ground Bone.....Total	22.88	2.47	....
Pure Ground Bone.....Total	20.59	3.70	....
Superphosphate.....	16.00	....	....
Canton Baker's Dissolved S. C. Phosphate....	14.00	....	....
Detrick's XXtra Acid Phosphate.....	14.00	....	....
Lazaretto Acid Phosphate.....	14.00	....	....
Zell's Dissolved Phosphate.....	14.00	....	....
Zell's Acid Phosphate.....	13.00	....	....
Canton Chemical Gem Phosphate.....	12.00	....	....
Southern Wheat Grower.....	12.00	....	6.00
Detrick's Victory Alkaline Bone.....	12.00	....	5.00
Lazaretto High Grade Dissolved Phosphate and Potash.....	12.00	....	5.00
Canton Soluble Alkaline Phosphate.....	12.00	....	3.00
Detrick's P. & B. Special Fertilizer.....	12.00	....	3.00
Lazaretto Alkaline Bone Phosphate.....	12.00	....	3.00
New Rival Crop Producer.....	10.00	.82	1.00
Zell's High Grade Potash Fertilizer.....	10.00	....	4.00
Royal Alkaline Bone.....	10.00	....	4.00
Canton Soluble Phosphate Potash.....	10.00	....	2.00
Detrick's Soluble Phosphate and Potash....	10.00	....	2.00
Lazaretto Dissolved Phosphate and Potash..	10.00	....	2.00
Zell's Electric Phosphate.....	10.00	....	2.00
Tip Top Special.....	9.00	2.47	7.00
Special Tobacco Fertilizer.....	9.00	2.47	3.00
Holmes & Dawson's Productive Cotton and Peanut Grower.....	9.00	2.47	2.00
Zell's Royal High Grade Fertilizer.....	9.00	2.06	2.00
Zell's Victoria Animal Bone Compound....	9.00	1.85	4.00
Canton Chemical Animal Bone Fertilizer....	9.00	1.85	4.00
Detrick's Superior Animal Bone Fertilizer....	9.00	1.85	4.00
Lazaretto Retriever Animal Bone Fertilizer..	9.00	1.85	4.00
Holmes & Dawson's Gold Dust Guano.....	9.00	1.65	2.00
Lazaretto Peanut Grower.....	9.00	.82	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Reese Pacific Guano for Tobacco.....	8.50	2.47	2.50
Lazaretto Manure Substitute.....	8.00	3.29	4.00
Lazaretto Carolina Cotton Food.....	8.00	3.29	4.00
Excelsior Compound for Tobacco.....	8.00	2.47	5.00
Detrick's Quick Step Phosphate for Potatoes and Tobacco	8.00	2.47	4.00
Zell's Special Compound for Potatoes and Veg- etables	8.00	2.47	4.00
Zell's Tobacco Fertilizer.....	8.00	2.47	4.00
Zell's Bright Tobacco Grower.....	8.00	2.47	3.00
Zell's Reliance High Grade Manure.....	8.00	2.47	3.00
Canton Chemical Baker's Tobacco Fertilizer.	8.00	2.47	3.00
Canton Chemical Superior High Grade Fertil- izer	8.00	2.47	3.00
Detrick's Special Tobacco Fertilizer.....	8.00	2.47	3.00
Lazaretto Challenge Fertilizer.....	8.00	2.47	3.00
Lazaretto Special Tobacco and Potato Fertil- izer	8.00	2.47	3.00
Canton Chemical CCC Special Compound.....	8.00	2.06	6.00
Canton Chemical Baker's Standard High Grade Guano	8.00	2.06	3.00
Detrick's Vegetator Ammoniated Superphos- phate	8.00	2.06	3.00
Lazaretto Climax Plant Food.....	8.00	2.06	3.00
Slingluff's British Mixture.....	8.00	2.06	2.50
Lazaretto Universal Compound.....	8.00	2.06	2.00
Canton Chemical Virginia Standard Manure..	8.00	2.06	2.00
Detrick's Kangaroo Komplete Kompond.....	8.00	1.65	3.00
Canton Chemical Baker's Fish Guano.....	8.00	1.65	2.00
Canton Chemical Game Guano.....	8.00	1.65	2.00
Detrick's Royal Crop Grower.....	8.00	1.65	2.00
Detrick's Fish Mixture.....	8.00	1.65	2.00
Holmes & Dawson's Dawson's Crop Maker....	8.00	1.65	2.00
Holmes & Dawson's Triumph Soluble.....	8.00	1.65	2.00
Lazaretto Crop Grower.....	8.00	1.65	2.00
Reese Pacific Guano.....	8.00	1.65	2.00
Zell's Special Compound for Tobacco.....	8.00	1.65	2.00
Zell's Calvert Guano.....	8.00	1.65	2.00
Zell's Ammoniated Superphosphate.....	8.00	1.65	2.00
Zell's Fish Guano.....	8.00	1.65	2.00
Savage, Son & Co. Purity Guano.....	8.00	1.65	2.00
Moro Phillip's Standard Guano.....	8.00	.82	4.00
Fidelity Crop Grower.....	8.00	.82	3.00
Enterprise Alkaline Bone.....	8.00	....	5.00
Palmetto Alkaline Phosphate.....	8.00	....	4.00
Canton Chemical Excelsior Trucker.....	7.00	4.11	5.00
Detrick's Special Trucker.....	7.00	4.11	5.00
Lazaretto Early Trucker.....	7.00	4.11	5.00
Zell's Truck Grower.....	7.00	4.11	5.00
Empire Trucker	7.00	3.29	4.00
Zell's 7 Per Cent Potato and Vegetable Manure	6.00	5.76	5.00
Canton Chemical Truckers' Special 7 Per Cent.	6.00	5.76	5.00
Detrick's Gold Basis.....	6.00	5.76	5.00
Lazaretto Truckers' Favorite.....	6.00	5.76	5.00
Bull Head Potato and Vegetable Manure.....	6.00	4.11	7.00
Detrick's Gold Eagle.....	6.00	2.47	6.00
Zell's 10 Per Cent Trucker.....	5.00	8.23	3.00
Nitrate of Soda.....	....	15.00	....
Special H. G. Dried Blood.....	....	13.16	....
Special High Grade Dried Blood.....	....	13.16	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Dry Ground Fish.....	8.23	....
Muriate of Potash.....	49.00
Sulphate of Potash.....	48.00
Genuine German Kainit.....	12.00

A. D. Adair & McCarthy Bros., Atlanta, Ga.—

Adair's High Grade Dissolved Bone, No. 16..	16.00
A. and M. 15-4.....	15.00	....	4.00
Adair's High Grade Dissolved Bone.....	14.00	....	....
A. and M. 13-4.....	13.00	....	4.00
McCarty's Potash Formula, No. 5.....	12.00	....	5.00
McCarty's Potash Formula, No. 4.....	12.00	....	4.00
McCarty's Potash Formula.....	12.00	....	2.00
Adair's Dissolved Bone.....	12.00	....	....
David Harum Extra High Grade Blood Guano	10.00	3.30	4.00
Adair's H. G. Blood and Bone.....	10.00	2.47	3.00
Special Wheat Compound.....	10.00	1.65	4.00
Special Corn Compound.....	10.00	1.65	4.00
Special Vegetable Compound.....	10.00	1.65	4.00
Special Potato Compound.....	10.00	1.65	4.00
Special Cotton Compound.....	10.00	1.65	4.00
Special Tomato Compound.....	10.00	1.65	4.00
Adair's Soluble Pacific Guano.....	10.00	1.65	2.00
McCarty's High Grade Cotton Grower.....	10.00	1.65	2.00
McCarty's High Grade Corn Grower.....	10.00	1.65	2.00
Old Time Fish Scrap Guano.....	10.00	1.65	2.00
McCarty's Wheat Special.....	10.00	.82	3.00
McCarty's Corn Special.....	10.00	.82	3.00
McCarty's Cotton Special.....	10.00	.82	3.00
Adair's Wheat and Corn Grower, No. 8.....	10.00	....	8.00
H. G. Potash Compound, No. 8.....	10.00	....	8.00
H. G. Potash Compound, No. 6.....	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 6.....	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 5.....	10.00	....	5.00
H. G. Potash Compound, No. 5.....	10.00	....	5.00
High Grade Potash Compound.....	10.00	....	4.00
Adair's Wheat and Corn Grower.....	10.00	....	4.00
Adair's Formula	10.00	....	2.00
Adair's Blood, Bone and Tankage Guano.....	9.00	.82	2.00
Special Corn Grower.....	8.00	1.65	6.00
Special Wheat Grower.....	8.00	1.65	6.00
Special Potato Grower.....	8.00	1.65	6.00
Special Vegetable Grower.....	8.00	1.65	6.00
Standard Corn Grower.....	8.00	1.65	2.00
Planters' Soluble Fertilizer.....	8.00	1.65	2.00
Adair's Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Golden Grain Compound.....	8.00	.82	3.00
Adair's Special Potash Mixture, No. 6.....	8.00	....	6.00
Adair's Special Potash Mixture, No. 5.....	8.00	....	5.00
Adair's Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	15.00	....
Kainit .....	....	12.00	....
Muriate of Potash.....	....	....	50.00

Asheville Packing Co., Asheville, N. C.—

Asheville Packing Co.'s Pure Bone Meal.			
Total	18.00	2.00	....
Asheville Packing Co.'s H. G. Phosphoric Acid	16.00	....	....
Asheville Packing Co.'s Standard Phosphoric Acid	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Asheville Packing Co.'s Extra H. G. Potash Mixture	13.00	....	4.00
Asheville Packing Co.'s Standard Phosphoric Acid	12.00	....	....
Asheville Packing Co.'s Celebrated Tankage, Total	10.00	4.12	....
Asheville Packing Co.'s Extra H. G. Fertilizer	10.00	3.30	4.00
Asheville Packing Co.'s Blood and Bone.....	10.00	2.47	3.00
Asheville Packing Co.'s Extra H. G. Cotton Special	10.00	1.65	4.00
Asheville Packing Co.'s High Grade Biltmore Wheat Grower	10.00	1.65	3.00
Asheville Packing Co.'s H. G. Wheat, Corn and Oat Special.....	10.00	1.65	2.00
Asheville Packing Co.'s Standard Bone and Potash	10.00	.82	1.00
Asheville Packing Co.'s Superior Potato and Wheat Fertilizer	10.00	....	6.00
Asheville Packing Co.'s Special Potash Mix- ture	10.00	....	4.00
Asheville Packing Co.'s XXX Wheat Grower.	10.00	....	2.00
Asheville Packing Co.'s Standard Potato Fer- tilizer	9.00	.82	2.00
Asheville Packing Co.'s Extra H. G. Vegetable Special	8.00	4.12	5.00
Asheville Packing Co.'s Corn and Vegetable Special	8.00	2.47	3.00
Asheville Packing Co.'s Special Tobacco and Vegetable Fertilizer	8.00	2.47	3.00
Asheville Packing Co.'s Fruit Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Potato Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Champion Potato Fer- tilizer	8.00	1.65	4.00
Asheville Packing Co.'s Complete Fertilizer...	8.00	1.65	2.00
Asheville Packing Co.'s Standard Corn and Wheat	8.00	.82	3.00
Asheville Packing Co.'s Special Bone and Potash	8.00	....	4.00
Asheville Packing Co.'s H. G. Muriate of Pot- ash .....	....	....	50.00

Baugh & Sons Co., Phila., Pa., and Norfolk, Va.—

Baugh's Raw Bone Meal, Warranted Pure. Total	21.50	3.70
Baugh's 16 Per Cent Acid Phosphate.....	16.00	....	....
Baugh's Pure Bone and Muriate of Potash Mixture	15.00	2.47	5.00
Baugh's High Grade Acid Phosphate.....	14.00	....	....
Baugh's Pure Dissolved Animal Bones.....	13.00	2.06	....
Baugh's 12 and 5 Phosphate and Potash.....	12.00	....	5.00
Baugh's High Grade Cotton and Truck Guano	10.00	1.65	2.00
Baugh's High Grade Potash Mixture.....	10.00	....	4.00
Baugh's Soluble Alkaline Superphosphate....	10.00	....	2.00
Hassell's Tobacco Guano.....	9.00	2.26	2.00
Baugh's Fish, Bone and Potash.....	8.00	3.30	4.00
Baugh's Fruit and Berry Guano.....	8.00	2.47	10.00
Baugh's Special Tobacco Guano.....	8.00	2.47	5.00
Baugh's Grand Rapids High Grade Truck Guano	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Baugh's Sweet Potato Guano for Sweet Potatoes, Peas and Melons.....	8.00	2.47	3.00
Baugh's High Grade Tobacco Guano.....	8.00	2.47	3.00
Baugh's Complete Animal Base Fertilizer....	8.00	1.65	5.00
Baugh's Fish Mixture.....	8.00	1.65	2.00
Baugh's Animal Base and Potash Compound for All Crops.....	8.00	1.65	2.00
Baugh's Wheat Fertilizer for Wheat and Grass	8.00	1.65	2.00
Baugh's Southern States Excelsior Guano....	8.00	1.00	3.00
Glover's Special Potato Guano.....	7.00	3.30	8.00
Baugh's Southern States Guano for Bright Tobacco	7.00	2.88	7.00
Baugh's Potato and Truck Special.....	7.00	2.88	7.00
Baugh's Strawberry Mixture.....	7.00	2.47	5.00
Baugh's Fine Ground Fish.....	6.87	8.23	....
Baugh's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
Baugh's Peruvian Guano Substitute for Potatoes and All Vegetables.....	6.00	4.12	7.00
Baugh's 5-6-5 Guano.....	6.00	4.12	5.00
Baugh's Farmers' Friend Guano.....	6.00	4.12	5.00
Baugh's New Process 10 Per Cent Guano....	5.00	8.23	2.50
Baugh's Special Potato Manure.....	5.00	1.65	10.00
Baugh's Wrapper Leaf Brand for Seed Leaf Tobacco	3.50	3.30	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.23	....
Baugh's Fine Ground Dried Blood.....	....	13.16	....
Fine Ground Blood.....	....	13.00	....
Baugh's Soluble Top Dresser for All Crops...	....	8.23	3.00
Baugh's Fine Ground Tankage.....	....	7.40	....
Muriate of Potash.....	....	....	48.00
High Grade Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>M. J. Best & Sons, Goldsboro, N. C.—</i>			
Pure German Kainit.....	....	....	12.00
<i>S. T. Beveridge & Co., Richmond, Va.—</i>			
Beveridge's Raw Ground Bone Meal.....	20.00	4.50	....
Beveridge's Thomas or Basic Slag.....	18.00	....	....
<i>Paisley Boney, Goldsboro, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
<i>J. A. Benton, Ruffin, N. C.—</i>			
Benton's North Carolina Bright Fertilizer....	9.00	1.65	2.00
<i>Baltimore Fertilizer Co., Baltimore, Md.—</i>			
Honest Acid Phosphate.....	14.00	....	....
Honest Bone and Potash.....	10.00	....	2.00
Honest Sweet Potato Grower.....	8.00	2.40	4.00
Honest Cotton Grower.....	8.00	2.40	3.00
Honest Ammoniated Bone.....	8.00	1.60	2.00
Honest Revenue	7.00	2.40	6.00
Honest Success	7.00	.82	4.00
Honest Dixie Trucker.....	6.00	4.00	7.00
Honest Trucker	6.00	4.00	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Bertie Cotton Oil Co., Aulander, N. C.—</i>			
Bertie's High Grade Guano.....	8.00	4.13	5.00
Bertie's Meal Mixture.....	8.00	3.30	4.00
Bertie's Tobacco Grower.....	8.00	2.47	5.00
Bertie's Ideal Cotton Grower.....	8.00	2.47	3.00
Bertie's Special Compound.....	8.00	1.65	2.00
Bertie's Corn Mixture.....	7.00	2.47	2.00
Jumbo Peanut Grower.....	7.00	1.65	5.00
Bertie's Peanut Special.....	7.00	.82	4.00
Tar Heel Top Dresser.....	2.00	8.25	5.00
Nitrate of Soda.....	....	15.00	....
Sulphate of Potash.....	....	....	52.00
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

Bowker Fertilizer Co., Baltimore, Md.—

Pure Ground Bone.....Total	20.59	3.70	....
Fine Ground Bone.....Total	22.88	2.47	....
16 Per Cent Dissolved Bone Phosphate.....	16.00	....	....
Bowker's Soluble Phosphate.....	14.00	....	....
Golden Harvest Fertilizer.....	12.00	....	5.00
Superphosphate with Potash for Grain and Grass	10.00	....	2.00
Sure Crop Phosphate.....	9.00	.82	2.00
Tobacco Fertilizer	8.00	2.47	3.00
Eureka Cotton Compound.....	8.00	2.47	3.00
Empire Standard	8.00	1.65	2.00
Corn and Grain Grower.....	8.00	.82	4.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Blackstone Guano Co., Inc., Blackstone, Va.—

Blackstone Raw Bone.....Total	20.00	3.70
Clover Leaf 16 Per Cent Phosphate.....	16.00	....	....
B. G. Co. Acid Phosphate.....	14.00	....	....
Clover Leaf Grain Fertilizer.....	13.00	1.03	1.00
Dissolved Bone	10.00	1.03	1.00
B. G. Co., Inc., Bone and Potash.....	10.00	....	4.00
B. G. Co. Bone and Potash.....	10.00	....	2.00
Blackstone Special for Tobacco.....	9.00	2.47	3.00
Old Bellefonte	8.00	3.30	2.00
Clover Leaf Brand for Tobacco.....	8.00	2.47	3.00
Tobacco Special	8.00	2.47	3.00
Wrapper Brand	8.00	2.47	3.00
Jim Crow for Tobacco.....	8.00	2.47	3.00
Bellefonte	8.00	2.47	2.00
Hard Cash for Tobacco.....	8.00	2.06	2.00
Carolina Special for Tobacco.....	8.00	1.65	4.00
Standard Guano	8.00	1.65	2.00
Red Letter for Tobacco.....	8.00	1.65	2.00
Alliance for Tobacco.....	8.00	1.65	2.00
Leader for Tobacco.....	8.00	1.65	2.00

John L. Bailey Co., Elm City, N. C.—

Fairmont Guano	8.00	2.47	3.00
Stag Brand Fertilizer.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate	14.00	....	....
Burton's Alkaline	10.00	....	4.00
Burton's Potash Mixture.....	10.00	....	2.00
High Grade Tobacco.....	8.00	3.29	4.00
Burton's Best	8.00	2.47	3.00
Tobacco Queen	8.00	2.47	3.00
Burton's High Grade.....	8.00	2.06	3.00
Burton's Carolina Tobacco Special.....	8.00	1.65	4.00
Burton's Butcher Bone.....	8.00	1.65	2.00

Bradley Fertilizer Co., Charleston, S. C.—

High Grade Bradley's Dissolved Phosphate...	16.00	....	....
High Grade Bradley's Acid Phosphate.....	14.00	....	....
Standard Bradley's XXX Acid Phosphate...	13.00	....	....
Standard Bradley's Acid Phosphate.....	12.00	....	....
Standard Bradley's Palmetto Acid Phosphate.	12.00	....	....
H. G. Bradley's Selected Guano.....	10.00	1.65	4.00
High Grade Bradley's Potash Acid Phosphate.	10.00	....	4.00
Standard Bradley's Wheat Grower.....	10.00	....	2.00
Standard Bradley's Bone and Potash.....	10.00	....	2.00
Standard Bradley's Ammoniated Dissolved Bone	9.00	1.85	1.00
Standard Bradley's Patent Superphosphate...	9.00	1.85	1.00
Standard B. D. Sea Fowl Guano.....	9.00	1.85	1.00
Standard Eagle Ammoniated Bone Superphos- phate	9.00	1.85	1.00
High Grade Bradley's Circle Guano.....	8.00	3.29	4.00
High Grade Bradley's Guano.....	8.00	2.46	3.00
Standard Bradley's Cereal Guano.....	8.00	1.65	2.00
Standard Bradley's X Guano.....	8.00	1.65	2.00
German Kainit .....	....	....	12.00

Baltimore Pulverizing Co., Baltimore, Md.—

Royal Guano	8.00	1.65	2.00
5 Per Cent Potato Guano.....	7.00	4.11	5.00
Special 7 Per Cent Potato Guano.....	6.00	5.75	5.00

The Bryant Fertilizer Co., Alexandria, Va.—

Bryant's Bone Meal.....Total	22.50	2.47	....
Bryant's Acid Phosphate.....	17.00	....	....
Bryant's Acid Phosphate.....	16.00	....	....
Bryant's S. C. Dissolved Bone.....	14.00	....	....
Bryant's H. G. Wheat Mixture.....	12.00	....	6.00
Bryant's Bone and Potash.....	10.00	....	4.00
Bryant's Bone and Potash Mixture.....	10.00	....	2.00
Bryant's "Challenge" Highest Grade Tobacco Mixture	9.00	2.46	3.00
Bryant's Special Cotton-seed Meal Fertilizer.	9.00	2.26	2.00
Bryant's Bone Mixture for Tobacco.....	9.00	2.06	2.00
Bryant's H. G. Guano.....	8.00	3.29	4.00
Bryant's H. G. Fertilizer.....	8.00	2.47	3.00
Bryant's "Victor" Tobacco Fertilizer.....	8.00	2.47	3.00
Bryant's Choice C. S. M. 3 Per Cent Mixture.	8.00	2.47	2.00
Bryant's "Otter" Special Tobacco Fertilizer..	8.00	2.06	3.00
Bryant's Cotton and Corn Fertilizer.....	8.00	2.06	2.00
Bryant's Special Fertilizer for Tobacco.....	8.00	2.06	2.00
Bryant's Cotton Grower.....	8.00	1.65	2.00
Bryant's Special Fertilizer.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Bryant's Cotton-seed Meal Guano.....	8.00	1.65	2.00
Bryant's "Potomac" Bone Special for Tobacco.	8.00	1.65	2.00
Bryant's Special Formula for Grain and Grass	8.00	1.60	4.00
Bryant's Wheat Mixture	8.00	....	4.00
Bryant's Truck Grower.....	7.00	5.77	7.00
Bryant's Fish Scrap Guano.....	7.00	3.29	4.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Bryant's German Kainit.....	....	....	12.00

The Berkley Chemical Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Resolute Acid Phosphate.....	16.00	....	....
Berkley Acid Phosphate.....	14.00	....	....
Berkley Bone and Potash Mixture.....	11.00	....	2.00
Berkley Plant Food.....	10.00	....	4.00
Laurel Potash Mixture.....	10.00	....	2.00
Monitor Animal Bone Fertilizer.....	9.00	1.85	4.00
Select Crop Grower.....	8.50	2.06	2.50
Victory Special Crop Grower.....	8.00	3.29	4.00
Berkley Tobacco Guano.....	8.00	2.47	3.00
Advance Crop Grower.....	8.00	2.47	3.00
Brandon Superphosphate	8.00	1.65	2.00
Long Leaf Tobacco Grower.....	8.00	1.65	2.00
Berkley Peanut and Grain Grower.....	8.00	1.00	4.00
Superior Bone and Potash.....	8.00	....	4.00
Mascot Truck Guano.....	7.00	4.11	5.00
Royal Truck Grower.....	6.00	5.76	5.00
The Leader of the World.....	5.00	3.29	5.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Bragaw Fertilizer Co., Washington, N. C.—

Palmetto Acid Phosphate.....	14.00	....	....
Long Acre Bone Phosphate.....	14.00	....	....
Farmers' Union Meal Mixture.....	9.00	2.26	2.00
Beaufort County Guano.....	8.00	2.47	3.00
Havana Tobacco Guano	8.00	2.47	3.00
Tuckahoe Tobacco Guano.....	8.00	2.06	3.00
Old Reliable Premium Guano.....	8.00	1.65	2.00
Tar Heel Guano.....	8.00	1.65	2.00
Pamlico Truck	7.00	4.12	8.00
Riverview Potato Grower.....	6.00	5.76	5.00
Chocowinity Special Tobacco Guano.....	5.00	3.29	6.00
Sunrise Tobacco Guano.....	4.00	2.47	5.00
Genuine German Kainit .....	....	....	12.00

Conestee Chemical Co., Wilmington, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Conestee High Grade Acid Phosphate.....	14.00	....	....
Conestee Acid Phosphate.....	13.00	....	....
Conestee Bone and Potash.....	11.00	....	6.00
Conestee Bone and Potash.....	11.00	....	5.00
Conestee Bone and Potash.....	11.00	....	4.00
Conestee Bone and Potash.....	11.00	....	3.00
Conestee Bone and Potash.....	11.00	....	2.00
Conestee Bone and Potash.....	10.00	....	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Conestee Bone and Potash.....	10.00	....	5.00
Conestee Bone and Potash.....	10.00	....	4.00
Conestee Bone and Potash.....	10.00	....	3.00
Conestee Bone and Potash.....	10.00	....	2.00
Conestee Cotton Grower.....	9.00	2.27	2.00
Conestee Melon Grower.....	8.00	4.11	7.00
Conestee P. D. Q. Fertilizer.....	8.00	3.30	4.00
Conestee "O. K." Fertilizer.....	8.00	3.30	4.00
Conestee P. D. Q. Fertilizer for Tobacco.....	8.00	3.30	4.00
Conestee Plumb Good Fertilizer.....	8.00	2.47	4.00
Conestee Crop Grower for Tobacco.....	8.00	2.47	4.00
Conestee Fish Scrap Guano.....	8.00	2.47	3.00
Conestee Special Fertilizer.....	8.00	2.47	3.00
Conestee Special Tobacco Fertilizer.....	8.00	2.47	3.00
Conestee Fertilizer for Tobacco.....	8.00	2.47	2.50
Conestee Fertilizer.....	8.00	2.47	2.50
Conestee Crop Grower.....	8.00	2.06	3.00
Conestee Tobacco Grower.....	8.00	2.06	3.00
Conestee Complete Fertilizer.....	8.00	2.06	2.00
Conestee Special Grain Fertilizer.....	8.00	1.65	2.00
Conestee Standard Guano for Tobacco.....	8.00	1.65	2.00
Conestee Standard Guano.....	8.00	1.65	2.00
Cotton-seed Meal Guano for Tobacco.....	8.00	1.65	2.00
Cotton-seed Meal Guano.....	8.00	1.65	2.00
Conestee Bone and Potash.....	8.00	....	6.00
Conestee Bone and Potash.....	8.00	....	5.00
Conestee Bone and Potash.....	8.00	....	4.00
Conestee Root Crop Guano.....	7.00	4.11	7.00
Conestee High Grade Guano.....	6.00	4.95	8.00
Conestee Truck Grower.....	6.00	3.30	8.00
Conestee Corn Guano.....	6.00	2.47	3.00
Dried Fish Scrap.....	4.50	8.02	....
Conestee Special Top Dresser.....	4.00	8.25	4.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.83	....
Ground Dried Blood.....	....	12.91	....
Conestee Top Dresser.....	....	7.41	3.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
H. G. German Kainit 16 Per Cent.....	....	....	16.00
Genuine German Kainit.....	....	....	12.00

B. W. Browley, Mooresville, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Red	10.00	2.47	3.00
Leo	8.00	2.47	3.00
16 Per Cent Dried Blood.....	....	13.17	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Columbia Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Raw Bone Meal.....Total	20.25	3.71	....
Columbia High Grade 16 Per Cent Acid Phosphate	16.00	....	....
Columbia 14 Per Cent Acid Phosphate.....	14.00	....	....
Columbia Dissolved Bone.....	13.00	....	....
Columbia Acid Phosphate.....	12.00	....	....
Columbia 11 and 5 Bone and Potash Mixture.....	11.00	....	5.00
Columbia 10 and 5 Bone and Potash Mixture.....	10.00	....	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Columbia 10 and 4 Bone and Potash Mixture.	10.00	....	4.00
Columbia Bone and Potash for Grain.....	10.00	....	3.00
Columbia Bone and Potash Mixture.....	10.00	....	2.00
McRae's Special	9.00	4.12	7.00
Columbia C. S. M. Special.....	9.00	2.27	2.00
Roanoke Ammoniated Guano.....	9.00	1.65	3.00
Carolina Soluble Guano.....	9.00	1.65	1.00
McRae's High Grade Guano.....	8.00	3.30	7.00
Pelican Ammoniated Guano.....	8.00	3.30	4.00
Columbia Special Truck Guano.....	8.00	3.30	4.00
Trojan Tobacco Guano.....	8.00	3.30	4.00
Columbia Special 4-8-3.....	8.00	3.30	3.00
Hayes' Special	8.00	3.30	3.00
Olympia Cotton Guano.....	8.00	2.47	3.00
Hyco Tobacco Guano.....	8.00	2.47	3.00
Our Best Meal Guano.....	8.00	2.47	3.00
Royal Tobacco Fertilizer.....	8.00	2.06	3.00
Columbia Special Guano.....	8.00	2.06	2.00
Columbia Soluble for Tobacco.....	8.00	1.65	2.00
Columbia Special Wheat Fertilizer.....	8.00	1.65	2.00
Columbia Soluble Guano	8.00	1.65	2.00
Spinola Peanut Grower.....	8.00	1.02	4.00
Columbia 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Columbia Special 7 Per Cent Truck Guano...	7.00	5.77	7.00
Columbia Potato Guano.....	7.00	4.12	5.00
Crown Brand Peanut Guano.....	7.00	....	5.00
Crew's Special	5.85	4.49	10.00
Columbia Side Dresser.....	4.00	8.22	4.00
Columbia Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Columbia Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*Cumberland Bone and Phosphate Co., Portland,
Me., and Charleston, S. C.—*

Standard Cumberland Bone and Superphosphate of Lime.....	9.00	1.85	1.00
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The Coe-Mortimer Co., Charleston, S. C.—

Thomas Phosphate (Basic Slag).....	19.00
Thomas Phosphate (Basic Slag).....	17.50
Thomas Phosphate (Basic Slag).....	17.00	....	....
Imported Ground Fish Guano, No. 2.....	6.80	9.46	....
Imported Ground Fish Guano, No. 1.....	6.80	8.23	....
High Grade Tankage.....	6.80	8.22	....
High Grade Tankage.....	6.80	7.45	....
Imported Fish Guano.....Total	6.20	5.60	....
High Grade Tankage.....	5.00	8.23	....
High Grade Tankage.....Total	5.00	7.61	....
Imported Fish Guano.....Total	4.48	5.77	....
Imported Fish Guano.....Total	2.00	9.87	....
Nitrate of Soda.....	....	14.76	....
Dried Blood, No. 2.....	....	13.37	....
Nitrate of Potash.....	....	12.30	44.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Cooper Guano Co., Wilmington, N. C.—</i>			
Cooper's 16 Per Cent Acid Phosphate.....	16.00	....	....
Cooper's 14 Per Cent Acid Phosphate.....	14.00	....	....
Cooper's Grain Producer.....	10.00	....	4.00
Cooper's Grain Grower.....	10.00	....	2.00
Cooper's Reorder	8.85	1.65	2.00
Cooper's Kite	8.00	4.11	7.00
Cooper's Helmet	8.00	3.29	4.00
Cooper's Herto	8.00	3.29	4.00
Cooper's Chadbourn Trucker.....	8.00	2.47	10.00
Cooper's Henox	8.00	2.47	3.00
Cooper's Sunset C. S. M.....	8.00	2.47	3.00
Cooper's Clifford	8.00	2.47	3.00
Cooper's Swamp Fox.....	8.00	2.47	2.50
Cooper's Bunker Hill.....	8.00	2.06	3.00
Cooper's Crusoe	8.00	2.06	2.00
Cooper's Potato	8.00	1.65	10.00
Cooper's Reward	8.00	1.65	2.00
Cooper's Waccamaw	8.00	1.65	2.00
Cooper's Genuine Eagle Island.....	8.00	1.65	2.00
Cooper's Sterling Complete.....	8.00	1.65	2.00
Cooper's Peanut Bouncer.....	8.00	.83	4.00
Cooper's Finis	7.00	4.11	5.00
Nitrate of Soda.....	....	14.82	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00

Craven Chemical Co., New Bern, N. C.—

Panama 16 Per Cent Acid Phosphate.....	16.00	....	....
Jewel Acid Phosphate.....	14.00	....	....
Trent Bone and Potash.....	10.00	....	2.00
Halifax Guano	9.00	2.47	3.00
Prolix 9-2-3 Special Guano.....	9.00	1.65	3.00
Hanover Standard Guano.....	8.00	3.29	4.00
Duplin Tobacco Guano.....	8.00	2.47	3.00
Gaston High Grade Fertilizer.....	8.00	2.47	3.00
C. E. Foy High Grade Guano.....	8.00	2.47	3.00
Marvel Great Crop Grower.....	8.00	2.06	3.00
Elite Cotton Guano.....	8.00	1.65	2.00
Pantego Potato Guano.....	7.00	4.12	7.00
Neuse Truck Grower.....	6.00	4.94	6.00
Craven Chemical Co.'s Truck Guano, 5-10-2 $\frac{1}{2}$	5.00	8.24	2.50
Genuine German Kainit.....	....	....	12.00

William H. Camp, Petersburg, Va.—

Bone Meal.....	Total	22.50	3.80	....
Camp's Acid Phosphate.....		16.00	....	....
Camp's Acid Phosphate.....		14.00	....	....
Camp's Shepherd Brand Bone and Potash....		10.00	....	4.00
Camp's Bone and Potash.....		10.00	....	2.00
Camp's Yellow Head Chemicals.....		8.00	2.87	7.50
Camp's Lion and Monkey for Tobacco.....		8.00	2.46	3.00
Camp's Red Head Chemicals.....		8.00	2.25	2.00
Camp's Lion and Monkey.....		8.00	1.65	2.00
Camp's Green Head Chemicals, Irish Potato..		7.00	6.15	10.00
Camp's Above All.....		6.00	5.75	5.00
Nitrate of Soda.....		....	14.75	....
German Kainit .....		....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Clayton Oil Mill, Clayton, N. C.—</i>			
C. O. M. 16 Per Cent Acid Phosphate.....	16.00	....	....
C. O. M. 14 Per Cent Acid Phosphate.....	14.00	....	....
C. O. M. High Grade Bone and Potash.....	12.00	....	5.00
C. O. M. Wheat Compound.....	10.00	2.05	4.50
C. O. M. Special Corn Mixture.....	10.00	....	5.00
C. O. M. Bone and Potash.....	10.00	....	4.00
C. W. H. Special.....	8.00	4.10	5.00
Clayton Guano.....	8.00	2.47	3.00
Clayton Special Tobacco Grower.....	8.00	2.47	3.00
Planters' Favorite.....	8.00	2.47	3.00
Cotton Queen.....	8.00	1.65	2.00
Summer Queen.....	8.00	1.65	2.00
C. O. M. Top Dresser.....	2.00	6.56	1.50
Perfection Top Dresser.....	....	9.85	4.00
C. O. M. German Kainit.....	....	....	12.00

The Chesapeake Chemical Co., Baltimore, Md.—

C. C. C.'s Rapid Trucker.....	8.00	3.28	7.00
C. C. C.'s Pure German Kainit.....	....	....	12.40

Cowell, Swan & McCotter Co., Bayboro, N. C.—

Bone Phosphate.....	14.00	....	....
Standard Cotton Grower.....	8.00	3.30	3.00
Champion Guano.....	8.00	2.47	3.00
Cowell's Great Tobacco Grower.....	8.00	2.47	3.00
Quick Grower Guano.....	8.00	2.06	3.00
Rust Proof Cotton Guano.....	8.00	1.65	3.00
Crop Guano.....	8.00	1.65	2.00
Great Cabbage and Potato Guano.....	7.00	5.77	7.00
Oriental Trucker.....	7.00	4.12	8.00
Aurora Trucker.....	7.00	4.12	7.00
High Grade Truck Guano.....	7.00	4.12	5.00
Potato Favorite Guano.....	7.00	3.30	7.00
Cabbage Guano.....	5.00	8.25	2.50
German Kainit.....	....	....	12.00

Congaree Fertilizer Co., Charleston, S. C.—

Congaree H. G. Acid Phosphate (3).....	16.00	....	....
Congaree H. G. Acid Phosphate.....	14.00	....	....
Congaree H. G. Acid Phosphate.....	13.00	....	....
Congaree Superphosphate and Potash.....	11.00	....	1.00
Congaree Superphosphate and Potash.....	10.00	....	4.00
Congaree Superphosphate and Potash.....	10.00	....	3.00
Congaree Superphosphate and Potash.....	10.00	....	2.00
Congaree Ammoniated Bone Superphosphate.	9.00	2.26	2.00
Congaree Prize Winner.....	9.00	1.65	2.00
Congaree Double Ammoniated.....	8.00	6.78	4.00
Congaree Early Trucker.....	8.00	3.30	8.00
Congaree Early Boll.....	8.00	3.30	6.00
Congaree H. G. Fish Guano.....	8.00	3.30	4.00
Congaree Debt Payer.....	8.00	3.30	4.00
Congaree Tobacco Grower.....	8.00	3.30	4.00
Congaree H. G. Fish Guano.....	8.00	2.47	3.00
Congaree Soil Builder.....	8.00	2.47	3.00
Congaree Special Meal Mixture.....	8.00	2.47	3.00
Congaree Tobacco Grower.....	8.00	2.47	3.00
Congaree H. G. Corn Guano.....	8.00	2.47	2.00
Congaree Farmers' Choice.....	8.00	2.06	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
North Carolina Standard.....	8.00	1.64	2.00
Congaree Superphosphate and Potash.....	8.00	....	4.00
Truck Farmers' Choice.....	7.00	4.13	7.00
Congaree Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	14.79	....
Congaree Ash Element.....	....	8.23	6.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Chickamauga Fertilizer Works, Atlanta, Ga.—

Chickamauga High Grade Dissolved Bone, No. 16.....	16.00
Chickamauga High Grade Dissolved Bone....	14.00	....	....
Chickamauga 13-4.....	13.00	....	4.00
Chickamauga Potash Special, No. 4.....	12.00	....	4.00
Chickamauga Potash Special.....	12.00	....	2.00
Chickamauga Dissolved Bone.....	12.00	....	....
Chickamauga Very Best.....	10.00	3.30	4.00
Ben Hur H. G. Guano.....	10.00	2.47	3.00
Special Potato Compound.....	10.00	1.65	4.00
Special Wheat Compound.....	10.00	1.65	4.00
Special Vegetable Compound.....	10.00	1.65	4.00
Special Corn Compound.....	10.00	1.65	4.00
Chickamauga High Grade Fertilizer.....	10.00	1.65	2.00
Chickamauga High Grade Plant Food.....	10.00	1.65	2.00
Chickamauga Fish Scrap Guano.....	10.00	1.65	2.00
Chickamauga Wheat Special	10.00	.82	3.00
Chickamauga Corn Special.....	10.00	.82	3.00
Chickamauga Cotton Special.....	10.00	.82	3.00
Old Glory Mixture.....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower, No. 8.	10.00	....	8.00
Chickamauga Wheat and Corn Grower, No. 6.	10.00	....	6.00
Chickamauga Wheat and Corn Grower, No. 5.	10.00	....	5.00
Chickamauga Wheat and Corn Grower.....	10.00	....	4.00
Chickamauga Bone and Potash.....	10.00	....	2.00
Chickamauga Blood, Bone and Tankage Guano	9.00	.82	2.00
Special Potato Grower.....	8.00	1.65	6.00
Special Wheat Grower.....	8.00	1.65	6.00
Special Vegetable Grower.....	8.00	1.65	6.00
Special Corn Grower.....	8.00	1.65	6.00
Chickamauga Complete Fertilizer.....	8.00	1.65	2.00
Chickamauga Standard Corn Grower.....	8.00	1.65	2.00
Chickamauga Standard Wheat Grower.....	8.00	1.65	2.00
Georgia Home Guano.....	8.00	1.65	2.00
No. 3 Bone, Tankage and Potash Mixture....	8.00	.82	3.00
Chickamauga Alkaline Bone, No. 6.....	8.00	....	6.00
Chickamauga Alkaline Bone, No. 5.....	8.00	....	5.00
Chickamauga Alkaline Bone.....	8.00	....	4.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	50.00

Canton Fertilizer Co., Canton, Ga.—

High Grade Acid Phosphate.....	16.00	....	....
Acid Phosphate	14.00	....	....
R. T. Jones Extra H. G.....	10.00	2.47	3.00
Elberta	10.00	2.06	7.00
North Georgia High Grade.....	10.00	2.06	3.00
Southern King High Grade.....	10.00	1.65	2.00
Fish Ammoniated High Grade.....	10.00	1.65	2.00
Orange High Grade.....	10.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Jomco High Grade.....	10.00	1.65	2.00
Quickstep Wheat and Grain Grower.....	10.00	.82	3.00
Special Potash Mixture.....	10.00	....	4.00
Fish Ammoniated Standard.....	8.00	1.65	2.00
Jomco Standard Grade.....	8.00	1.65	2.00
Southern King Standard Grade.....	8.00	1.65	2.00
Dissolved Bone and Potash.....	8.00	....	4.00

The Chesapeake Chemical Co., Baltimore, Md.—

C. C. Co.'s Reliable Phosphate.....	10.00	....	4.00
C. C. Co.'s Celebrated Mixture.....	10.00	....	2.00
C. C. Co.'s Dissolved Phosphate.....	14.00	....	....
C. C. Co.'s High Grade Guano.....	8.00	3.28	4.00
C. C. Co.'s Excelsior Fertilizer.....	8.00	2.46	4.00
C. C. Co.'s Fish Guano.....	8.00	2.46	3.00
C. C. Co.'s Ammoniated Phosphate.....	8.00	1.64	3.00
C. C. Co.'s National Crop Grower.....	8.00	1.64	2.00
C. C. Co.'s Keystone Phosphate.....	7.00	3.28	5.00
C. C. Co.'s Potato Compound.....	6.00	4.10	5.00
C. C. Co.'s Prolific Top Dresser.....	....	7.51	3.50

Caraleigh Phosphate and Fertilizer Works,

Raleigh, N. C.—

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....	16.00	....	....
Climax Dissolved Bone.....	14.00	....	....
Sterling Acid Phosphate.....	13.00	....	....
Stable Acid Phosphate.....	12.00	....	....
Horne & Son's High Grade Bone and Potash.	11.00	....	5.00
Special Bone and Potash Mixture.....	10.00	....	4.00
Morris & Scarboro's Special Bone and Potash.	10.00	....	3.00
Electric Bone and Potash Mixture.....	10.00	....	2.00
Pacific Tobacco and Cotton Grower.....	9.00	2.26	2.00
Rhamkatte Special Tobacco Guano.....	8.00	3.30	6.00
Special 8-4-4	8.00	3.30	4.00
Horne's Best	8.00	2.47	3.00
Eclipse Ammoniated Guano.....	8.00	2.47	3.00
Planters' Pride	8.00	2.06	3.00
Caraleigh Special Tobacco Guano.....	8.00	2.06	3.00
Eli Ammoniated Fertilizer.....	8.00	1.65	2.00
Crown Ammoniated Guano.....	8.00	1.65	2.00
Comet Guano	8.00	.82	3.00
Buncombe Wheat Grower.....	8.00	....	4.00
Caraleigh Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Crown Fertilizer Co., Baltimore, Md.—

Crown 4-8-4	8.00	3.29	4.00
Crown 3-8-3	8.00	2.47	3.00
Crown 2½-8-3	8.00	2.06	3.00
Crown 2-8-2	8.00	1.65	2.00
Crown Top Dressing.....	....	7.41	3.00

W. B. Cooper, Wilmington, N. C.—

Nitrate of Soda.....	....	14.82	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Contentnea Guano Co., Wilson, N. C.—</i>			
High Grade 16 Per Cent Acid.....	16.00	....	....
Contentnea 14 Per Cent Acid.....	14.00	....	....
Special Formula Fertilizer.....	12.00	1.65	4.00
Special Formula	10.00	4.10	6.00
Bone and Potash Mixture.....	10.00	....	5.00
Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Howard and Williams Cotton Special.....	9.00	3.30	6.00
Carr's Special for Cotton.....	9.00	2.47	2.75
Contentnea Cotton Formula.....	9.00	2.25	2.00
16 Per Cent German Kainit.....	....	....	16.00
S-4½-7 for Tobacco.....	8.00	3.70	7.00
S-4½-7 for Cotton.....	8.00	3.70	7.00
Whitehead Farm Cotton Grower.....	8.00	3.30	5.00
Climax High Grade.....	8.00	3.29	4.00
High Grade Tobacco Grower.....	8.00	2.88	5.00
Carr's Special for Tobacco.....	8.00	2.67	6.00
Government Formula, No. 1.....	8.00	2.47	10.00
Government Formula, No. 2.....	8.00	2.47	8.00
Victor Fertilizer for Tobacco.....	8.00	2.47	5.00
Tobacco Growers' Special Formula.....	8.00	2.47	4.00
Pick Leaf Tobacco Fertilizer.....	8.00	2.47	3.00
Top Notch	8.00	2.47	3.00
Contentnea Cotton Grower.....	8.00	2.47	2.50
Contentnea Tobacco Special.....	8.00	2.05	3.00
Blood and Bone Cotton Compound.....	8.00	1.65	2.00
Contentnea Corn Special.....	5.00	1.65	5.00
Contentnea Top Dresser.....	3.00	8.23	5.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00
<i>J. W. Carter, Marton, N. C.—</i>			
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>Cooper Guano Co., Wilmington, N. C.—</i>			
Cooper's Bald Head Island.....	8.00	1.65	2.00
<i>C. P. Dey, Beaufort, N. C.—</i>			
Ground Fish Scrap.....	6.00	9.37	....
<i>Dixie Guano Co., Savannah, Ga.—</i>			
Phosphoric Acid.....	16.00	....	....
Phosphoric Acid.....	14.00	....	....
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00

Dixie Guano Co., Durham, N. C.—

Dixie 16 Per Cent Acid Phosphate.....	16.00
Dixie 14 Per Cent Acid Phosphate.....	14.00	....	....
Dixie Champion for Wheat and Corn.....	10.50	....	1.50
Jeff Davis Special.....	9.00	2.26	2.00
Dixie Star Ammoniated.....	9.00	1.65	1.00
Dixie Corn Fertilizer.....	9.00	.82	3.00
Radium Brand Guano.....	8.00	3.28	5.00
Dixie Tobacco Fertilizer.....	8.00	2.46	3.00
Carolina Special Ammoniated.....	8.00	2.46	3.00
Sulky Plow Brand Guano.....	8.00	2.46	2.00
Battle's Blood and Bone Fertilizer.....	8.00	2.05	3.00
Niagara Soluble Bone.....	8.00	2.05	2.00
Dixie Cotton Fertilizer.....	8.00	1.65	2.00
Old Plantation Superphosphate.....	8.00	1.65	2.00

Etiwan Fertilizer Co., Charleston, S. C.—

Etiwan 16 Per Cent Acid Phosphate.....	16.00	....	....
Etiwan High Grade Acid Phosphate.....	14.00	....	....
Etiwan Dissolved Bone.....	13.00	....	....
Diamond Soluble Bone.....	13.00	....	....
Etiwan Acid Phosphate with Potash.....	11.00	....	1.00
Plow Brand Acid Phosphate with Potash....	11.00	....	1.00
Etiwan Potash Bone.....	10.00	....	4.00
Etiwan Soluble Bone with Potash.....	10.00	....	3.00
Diamond Soluble Bone with Potash.....	10.00	....	2.00
XX Acid Phosphate with Potash.....	10.00	....	2.00
Etiwan Blood and Bone Guano.....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate.....	9.00	2.06	1.00
Etiwan 9-2-3 Per Cent Ammoniated Fertilizer.	9.00	1.65	3.00
Plow Brand Ammoniated Dissolved Bone....	8.85	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Etiwan Superior Cotton Fertilizer.....	8.00	3.30	6.00
Etiwan Special Cotton Fertilizer.....	8.00	3.30	4.00
Plow Brand Special Tobacco Fertilizer.....	8.00	3.30	4.00
Etiwan Cotton Compound.....	8.00	2.47	3.00
Etiwan High Grade Cotton Fertilizer.....	8.00	2.47	2.00
Etiwan Ammoniated Fertilizer.....	8.00	1.65	2.00
Plow Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Etiwan Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Elmore Gin and Fertilizer Co., Elmore Siding, N. C.—

Elmore Cantaloupe Special.....	8.00	4.00	7.00
Elmore Standard Cotton Fertilizer.....	8.00	3.00	3.00
Elmore X Fertilizer.....	8.00	2.60	2.70

Eastern Cotton Oil Co., Hertford, N. C.—

Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
Currituck Special for Yellow Sweets.....	8.00	3.29	6.00
Mat White Special.....	8.00	3.29	4.00
Itgrows Currituck Yellows.....	8.00	2.47	3.00
Rain-proof Cotton Grower.....	8.00	2.47	3.00
Fish and Blood Mixture.....	8.00	1.65	2.00
Perquimans Favorite.....	8.00	1.65	2.00
Early Bird.....	7.00	4.12	5.00
Hertford Truck Grower.....	6.00	5.77	5.00
Tankage and Fish Substitute, Peruvian Guano for Truck.....	6.00	4.12	7.00
Nun-Such Potato Grower.....	6.00	4.12	7.00
Sulphate Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Dried Fish.....	....	9.07	....
Fish Scrap.....	....	8.07	....
Muriate of Potash.....	....	....	49.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

The Eureka Fertilizer Co., Perryville, Md.—

Camden Special.....	8.00	2.05	3.00
High Grade Truckee.....	8.00	1.64	10.00
Farmers' Favorite.....	8.00	1.64	2.00
White Potato Special.....	6.00	4.11	7.00

Elba Manufacturing Co., Maxton, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Elba Melon Grower.....	8.00	4.12	7.00
Elba Superior Fertilizer.....	8.00	3.30	4.00
Elba High Grade Fertilizer.....	8.00	3.30	4.00
Elba Gold Seal Fertilizer.....	8.00	2.47	3.00
Elba Champion Fertilizer.....	8.00	2.47	3.00
Elba Uncle Tom Fertilizer.....	8.00	2.47	3.00
Elba Standard Fertilizer.....	8.00	1.65	2.00
Elba Hornets' Nest Fertilizer.....	6.00	5.75	5.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Farmers' Coöperative Guano Co., Blackstone, Va.—</i>			
Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Bone and Potash Compound 10-4.....	10.00	4.00	....
Jericho	10.00	1.02	....
Walk Over	9.00	1.02	1.00
Virginian	8.00	3.29	2.00
Free State Official.....	8.00	2.58	3.00
McHerrin Special	8.00	2.47	3.00
Nottoway Special	8.00	2.47	2.00
Pope's Peerless	8.00	1.64	3.00
Paul Jones	8.00	1.64	2.00
Farmers' Common Sense.....	8.00	1.23	3.00

Farmers Fertilizer Co., Spartanburg, S. C.—

Phosphoric Acid.....	16.00	....	....
Phosphoric Acid.....	14.00	....	....
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Blood and Bone.....	9.00	1.64	3.00
Beats All 9-2-2.....	9.00	1.64	2.00
Standard	8.75	1.64	2.00
Blood, Bone and Potash.....	8.75	1.64	2.00
Farmers' Favorite H. G. Fertilizer.....	8.00	2.47	3.00
Special Corn Fertilizer.....	8.00	1.64	4.00
Standard Grade Fertilizer.....	8.00	1.64	4.00
Standard Grade	8.00	1.64	2.00

Farmers Guano Co., Raleigh, N. C.—

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Farmers Acid Phosphate.....	13.00	....	....
Special Bone and Potash Mixture.....	10.00	....	4.00
Century Bone and Potash Mixture.....	10.00	....	2.00
Farmers Blood and Bone.....	8.00	3.29	4.00
Money Point Guano.....	8.00	2.47	3.00
Golden Grade Guano.....	8.00	2.47	3.00
Big Crop Guano.....	8.00	2.06	3.00
Toco Tobacco Guano.....	8.00	2.06	3.00
State Standard Guano.....	8.00	1.65	2.00
Special Bone and Potash.....	8.00	....	4.00
Farmers Formula	7.00	2.47	3.25
Farmers Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Floradora Guano Co., Laurinburg, N. C.—

Humus	10.00	3.29	5.00
Rocky Ford	10.00	2.47	7.00
North Robeson Special.....	9.00	1.65	4.00
Florena	8.00	3.29	4.00
Floradora	8.00	3.29	4.00
Oceola	8.00	2.47	3.00
Rob Roy.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Red Raven.....	8.00	1.65	3.00
Bostick's High Grade.....	7.00	3.29	5.00
Scotland Special	6.40	2.13	3.00

Farmville Oil and Fertilizer Co., Farmville, N. C.—

XXX High Grade Acid Phosphate.....	18.00	....	....
XX High Grade Acid Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
FFF Bone and Potash.....	12.00	....	4.00
Farmville High Grade (C. S. M.).....	10.00	2.47	4.00
Davis's Corn Grower.....	10.00	.82	5.00
Pitt County Corn Grower.....	10.00	.82	4.00
Farmville's Favorite Fertilizer.....	9.00	2.90	5.00
Big Leaf (Tobacco Grower).....	9.00	2.88	4.00
Greene County Special (for tobacco).....	9.00	2.67	5.00
Willow Green (Cotton Grower).....	9.00	2.26	2.00
Scientific Cotton Grower.....	9.00	2.26	2.00
Specific Cotton Grower.....	9.00	2.26	2.00
East Carolina Cotton Grower.....	9.00	2.25	2.00
Davis's Special Guano.....	8.00	3.70	7.00
Carolina Chief	8.00	3.30	4.00
Lang's Favorite	8.00	3.30	4.00
Farmville Special	8.00	3.30	4.00
Turnage's Fish Scrap Mixture.....	8.00	3.30	4.00
Harriss's Bright Leaf Tobacco Grower.....	8.00	3.30	4.00
Obelisk	8.00	3.00	4.00
Pride of Farmville.....	8.00	3.29	3.00
Uncle Sam's Tobacco Grower.....	8.00	3.29	3.00
Pride of Pitt.....	8.00	2.47	4.00
Harriss's Special Tobacco Grower.....	8.00	2.47	3.00
Turnage's Fish Scrap Mixture.....	8.00	2.47	3.00
Congo	8.00	2.47	3.00
Pride of Grimmersburg.....	8.00	2.47	3.00
Davis's High Grade Tobacco Manure.....	8.00	2.47	3.00
Marlboro Tobacco Grower.....	8.00	2.47	3.00
Golden Crown	8.00	2.47	3.00
Marlboro Cotton Grower (C. S. M.).....	8.00	2.47	3.00
Chamblee & Sons' Special.....	8.00	2.26	2.00
Pitt County Cotton Grower.....	8.00	2.25	4.50
Perfect Tobacco Guano.....	8.00	2.06	3.00
Pollard's Special Formula.....	8.00	2.05	5.00
Contentnea Special	8.00	2.05	3.00
Perfect Tobacco Guano.....	8.00	2.05	3.00
Cotton King	8.00	2.00	4.00
Davis's Cotton Grower.....	8.00	1.65	2.00
Carolina Standard	8.00	1.65	2.00
Farmville Standard (C. S. M.).....	8.00	1.65	2.00
Farmville's Bone Mixture.....	8.00	1.65	2.00
Second Application (for cotton).....	6.00	4.10	4.00
Lang's High Grade Tobacco Manure.....	6.00	2.88	6.00
Evergreen Top Dresser.....	4.00	8.24	4.00
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Fremont Oil Mills, Fremont, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Fremont High Grade Bone and Potash.....	10.00	....	4.00
Fremont Oil Mill Co.'s Bone and Potash.....	10.00	....	2.00
Carolina C. S. M. Compound.....	9.00	2.26	2.00
Fremont High Grade Guano.....	8.00	3.29	4.00
Fremont Oil Mill Co.'s Special Tobacco.....	8.00	2.47	5.00
Fremont Tobacco Guano.....	8.00	2.47	5.00
Fremont Standard Fertilizer.....	8.00	2.47	3.00
Wayne County Standard.....	8.00	2.47	3.00
Nahunta Special.....	8.00	2.47	3.00
Square Deal.....	8.00	2.05	3.00
Up-to-date.....	8.00	1.65	2.00
Home Run.....	8.00	1.65	2.00
F. O. M. Co. Top Dresser.....	3.00	7.40	5.00
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

Farmers Cotton Oil Co., Wilson, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Bonum Acid Phosphate.....	14.00	....	....
Contentnea Acid Phosphate.....	13.00	....	....
Washington's Corn Mixture Guano.....	10.00	.82	5.00
Xtra Good Bone and Potash.....	10.00	....	2.00
Dean's Special Guano.....	8.00	3.70	7.00
Regal Tobacco Guano.....	8.00	2.88	5.00
Newsome's Tobacco Special.....	8.00	2.47	4.00
J. D. Farrior's Special Guano.....	8.00	2.47	3.00
Graves' Cotton Grower Guano.....	8.00	2.47	3.00
Golden Gem Guano.....	8.00	2.47	3.00
Wilson High Grade Guano.....	8.00	2.27	2.00
Planters' Friend Guano.....	8.00	2.06	3.00
Carolina Choice Tobacco Guano.....	8.00	2.06	3.00
Crop King Guano.....	8.00	1.65	2.00
Farmers' Special Guano.....	8.00	1.65	2.00
Rogers' Truck Grower.....	7.00	5.76	7.00
Wilson Top Dresser.....	2.00	9.05	4.00
Perfect Top Dresser.....	2.00	8.23	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.63	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
German Kainit.....	....	....	12.00

Franklin Cotton Oil and Fertilizer Co., Inc.,

Franklin, Va.—

Pretlow & Co.'s H. G. Acid Phosphate.....	16.00	....	....
Pretlow & Co.'s H. G. Truck Fertilizer.....	8.00	4.12	5.00
Pretlow & Co.'s Cotton-seed Meal Mixture.....	8.00	2.47	3.00
Pretlow & Co.'s Champion Guano.....	8.00	1.65	2.00
Pretlow & Co.'s Peanut Grower.....	8.00	1.00	4.00
Pretlow & Co.'s H. G. 7 Per Cent Guano.....	7.00	5.76	7.00
Pretlow & Co.'s Genuine German Kainit.....	12.00

N. G. Granby Co., Elizabeth City, N. C.—

Acid Phosphate.....	16.00
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Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Griffith & Boyd Co., Baltimore, Md.—</i>			
High Grade Acid Phosphate.....	16.00	....	....
Growers' Favorite	8.00	3.29	4.00
Seven Per Cent Guano.....	5.00	6.77	5.00
Nitrate of Soda.....	....	15.66	....
<i>Germofert Manufacturing Co., Charleston, S. C.—</i>			
Grain Fertilizer	5.00	.82	6.00
Fruit and Flower Fertilizer.....	2.00	3.29	6.00
<i>Georgia Chemical Works, Augusta, Ga.—</i>			
High Grade Dissolved Bone Phosphate.....	16.00	....	....
Extra Dissolved Bone Phosphate.....	14.00	....	....
Dissolved Bone Phosphate.....	13.00	....	....
12 Per Cent Dissolved Bone Phosphate.....	12.00	....	....
High Grade XX Acid Phosphate with Potash.	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Gem Crop Grower.....	9.00	1.65	2.00
Cardinal High Grade.....	8.00	3.29	4.00
Intensive Formula	8.00	2.47	3.00
Three Oaks High Grade Guano.....	8.00	2.47	2.00
Georgia Formula	8.00	1.65	2.00
XXX Meal Mixture.....	8.00	1.65	2.00
Acid Phosphate with 4 Per Cent Potash.....	8.00	....	4.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
<i>German Kali Works, Baltimore, Md.—</i>			
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00
<i>R. C. Gilliam, Norfolk, Va.—</i>			
Gilliam's Special 5 Per Cent Guano.....	7.00	4.11	5.00
Gilliam's Special Potato Guano.....	6.00	5.76	6.00
Gilliam's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
<i>Home Fertilizer and Chemical Co., Baltimore, Md.—</i>			
Champion Dissolved Phosphate.....	16.00	....	....
Boykin's High Grade Acid Phosphate.....	14.00	....	....
Boykin's Dissolved Animal Bone.....	12.00	1.65	....
Gilt Edge Crop Grower.....	10.00	1.65	4.00
Home Bone and Potash.....	10.00	....	5.00
Boykin's Alkaline Bone.....	10.00	....	2.00
Home Ammoniated Bone.....	9.00	1.65	3.00
Home B. G. Ammoniated Compound.....	9.00	.82	5.00
Everybody's Fertilizer	9.00	.82	2.00
Home Standard Guano.....	8.00	3.29	4.00
Riosa Tobacco Compound.....	8.00	2.48	3.00
Special C. & C. Compound.....	8.00	2.48	3.00
Yancey's Formula for Yellow Leaf Tobacco...	8.00	2.48	2.00
Phoenix Crop Grower.....	8.00	2.48	2.00
Home Potato Special.....	8.00	1.65	10.00
Matchless Guano.....	8.00	1.65	4.00
Boykin's Cereal Fertilizer.....	8.00	1.65	2.00
Ammoniated Bone Manure.....	7.00	1.65	5.00
Farmers' Choice	7.00	.82	4.00
Truckers' Special Compound.....	6.00	5.77	5.00
Boykin's Vegetable Fertilizer.....	6.00	4.12	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Boykin's Home Potato Grower.....	6.00	3.30	4.00
Cerealite Top Dresser.....	7.43	3.00
Home Fertilizer.....	5.77	7.00
Sulphate of Ammonia.....	20.62	....
Nitrate of Soda.....	14.85	....
Muriate of Potash.....	50.00
Sulphate of Potash.....	48.00
German Kainit.....	12.00

Hadley, Harris & Co., Wilson, N. C.—

Hadley's Special 8-4½-7 Mixture.....	8.00	3.70	7.00
Hadley's Tobacco and Cotton Special.....	8.00	2.47	5.00
Golden Weed Tobacco Grower.....	8.00	2.47	3.00
Hadley Boss Guano.....	8.00	2.26	2.50
Daisy Fish Mixture.....	8.00	1.65	2.00
Top Dressing.....	2.00	8.23	5.00
Nitrate of Soda.....	....	15.60	....
German Kainit.....	....	....	12.00

Hampton Guano Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Supreme Acid Phosphate.....	16.00	....	....
Hampton Acid Phosphate.....	14.00	....	....
Hampton Bone and Potash Mixture.....	11.00	....	2.00
Hampton Crop Grower.....	10.00	....	4.00
Dauntless Potash Mixture.....	10.00	....	2.00
Arlington Animal Bone Fertilizer.....	9.00	1.85	4.00
Alpha Crop Grower.....	8.50	2.06	2.50
Little's Favorite Crop Grower.....	8.00	3.29	4.00
Hampton Tobacco Guano.....	8.00	2.47	3.00
P. P. P. (Princess Prolific Producer).....	8.00	2.47	3.00
Extra Tobacco Guano.....	8.00	1.65	2.00
Shirley Superphosphate.....	8.00	1.65	2.00
Hampton Special Grain and Peanut Fertilizer.	8.00	1.00	4.00
Excelsior Bone and Potash.....	8.00	....	4.00
Reliance Truck Guano.....	7.00	4.11	5.00
Virginia Truck Grower.....	6.00	5.76	5.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

S. B. Harrell & Co., Inc., Norfolk, Va.—

Harrell's Acid Phosphate.....	14.00	....	....
Harrell's Eclipse.....	9.00	2.26	2.00
Harrell's Champion Cotton and Peanut Grower.....	8.00	1.65	2.00
Harrell's Truck Guano.....	6.00	5.76	5.00

Hartsville Fertilizer Co., Hartsville, S. C.—

Coker's Special for Cotton.....	10.00	3.29	3.00
Hartsville Cotton Grower.....	8.00	3.29	4.00

M. P. Hubbard & Co., Baltimore, Md.—

Hubbard's Soluble S. C. Phosphate.....	16.00	....	....
Hubbard's Havana Special for Tobacco.....	8.00	2.48	3.00
Hubbard's Celebrated Phosphate.....	8.00	1.65	2.00
Hubbard's Maryland Special Vegetable Grower	7.00	4.13	5.00
Hubbard's Special Cotton and Corn Fertilizer.	7.00	1.65	5.00
Hubbard's 7 Per Cent Bermuda Guano.....	6.00	5.78	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	15.60	....
Ground Fish	8.25	....
Muriate of Potash.....	50.00

The Hubbard Fertilizer Co., Baltimore, Md.—

Gregory's 16 Per Cent Acid Phosphate.....	16.00	....	....
Hubbard's 14 Per Cent Phosphate.....	14.00	....	....
Hubbard's Special Mixture 10 and 4.....	10.00	....	4.00
Hubbard's B. and P. 10 and 2.....	10.00	....	2.00
Hubbard's Noxall	8.00	3.28	4.00
Hubbard's Royal Ensign.....	8.00	2.46	4.00
Hubbard's Yellow Wrapper.....	8.00	2.46	3.00
Hubbard's Fish Compound.....	8.00	1.64	3.00
Hubbard's Exchange Guano.....	8.00	1.64	2.00
Hubbard's Southern Leader.....	7.00	3.28	5.00
Hubbard's 5 Per Cent Royal Seal.....	6.00	4.10	5.00
Hubbard's Heavy Long Leaf.....	4.00	3.28	6.00
Hubbard's New Process Top Dresser.....	7.51	3.50
Pure German Kainit.....	12.00

L. Harvey & Son Co., Kinston, N. C.—

Nitrate of Soda.....	15.00
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Harby & Co., Sumter, S. C.—

Nitrate of Soda.....	14.85
Muriate of Potash.....	49.00
German Kainit	12.00

Interstate Chemical Co., Charleston, S. C.—

Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....
Acid Phosphate with Potash.....	11.00	....	1.00
Acid Phosphate with Potash.....	10.00	....	4.00
Acid Phosphate with Potash.....	10.00	....	2.00
Complete Fertilizer	9.00	2.06	2.00
Favorite Crop Grower.....	9.00	1.65	2.00
H. G. Ammoniated Fertilizer.....	8.00	3.30	4.00
Planters' Preference Guano.....	8.00	2.49	3.00
Challenge Brand Guano.....	8.00	2.06	2.00
Ammoniated Guano	8.00	1.64	2.00
Acid Phosphate with Potash.....	8.00	....	4.00
Special High Grade Formula.....	7.00	2.47	7.00
Nitrate of Soda.....	....	18.00	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

The Imperial Co., Norfolk, Va.—

Imperial Pure Ground Bone.....Total	20.00	3.70	....
Imperial H. G. Tennessee Acid Phosphate....	16.00	....	....
Imperial High Grade Acid Phosphate.....	14.00	....	....
Imperial Catawba Wheat Grower.....	10.00	....	4.00
Imperial Carolina Wheat Mixture.....	10.00	....	3.00
Imperial Virginia Grain Mixture.....	10.00	....	2.00
Imperial Bone and Potash.....	10.00	....	2.00
Imperial Martin County Special Crop Grower.	9.00	2.26	2.00
Imperial Snowflake Cotton Grower.....	8.00	3.29	4.00
Imperial Tobacco Grower.....	8.00	3.29	4.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Imperial X L. O. Cotton Guano.....	8.00	2.47	3.00
Imperial Tobacco Guano	8.00	2.47	3.00
Imperial Yellow Bark Sweet Potato Guano...	8.00	2.47	3.00
Imperial F. and B. Cotton Guano.....	8.00	2.06	3.00
Imperial Bright Tobacco Guano.....	8.00	2.06	3.00
Imperial Tennessee Tobacco Guano.....	8.00	1.65	8.00
Imperial Peanut Guano.....	8.00	1.65	4.00
Imperial Cotton Grower.....	8.00	1.65	2.00
Imperial Peanut and Corn Guano.....	8.00	1.65	2.00
Imperial Champion Guano.....	8.00	1.65	2.00
Imperial Cisco Soluble Guano.....	8.00	1.65	2.00
Imperial Standard Premium.....	8.00	1.65	2.00
Imperial Fish and Bone Grain Grower.....	8.00	.82	4.00
Imperial Yadkin Wheat Grower.....	8.00	....	4.00
Imperial 7-7 Potato Guano.....	7.00	5.76	7.00
Imperial High Grade Irish Potato Guano.....	7.00	4.11	8.00
Imperial Dawson's Cotton Grower.....	7.00	2.67	2.75
Imperial Roanoke Crop Grower.....	7.00	2.47	2.00
Imperial Asparagus Mixture.....	6.00	4.94	7.00
Imperial 5-6-7 Potato Guano.....	6.00	4.11	7.00
Imperial Williams' Special Potato Guano....	6.00	4.11	5.00
Imperial Fish and Bone.....	6.00	3.29	4.00
Imperial Sweet Potato Guano.....	6.00	1.65	6.00
Imperial 10 Per Cent Guano.....	5.00	8.23	2.50
Imperial Special 7 Per Cent for Potatoes....	5.00	5.76	5.00
Imperial Special Tobacco Guano.....	5.00	3.29	9.00
Imperial Laughinghouse Special Tobacco Guano	4.00	3.29	6.00
Imperial Conetoe Cotton Grower.....	4.00	3.29	4.00
Imperial Cubanola Tobacco Guano.....	4.00	2.47	5.00
Imperial Top Dresser for Cotton.....	2.00	8.23	....
Imperial Nitrate of Soda.....	....	15.00	....
Imperial Ground Fish Scrap.....	....	8.23	....
Imperial Animal Tankage.....	....	5.76	....
Imperial Sulphate of Potash.....	....	....	50.00
Imperial Muriate of Potash.....	....	....	49.00
Imperial Genuine German Kainit.....	....	....	12.00

Imperial Cotton Oil Co., Statesville, N. C.—

Imperial 16 Per Cent Acid Phosphate.....	16.00
Imperial High Grade Acid Phosphate.....	14.00	....	....
10-4 Bone and Potash.....	10.00	....	4.00
Imperial Bone and Potash.....	10.00	....	2.00
King Cotton	8.00	2.47	3.00
Imperial Corn Grower	8.00	2.47	1.50
"Grasol"	8.00	1.65	2.00
Imperial Cotton Grower.....	8.00	1.65	2.00

J. T. John, John's Station, N. C.—

Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

N. B. Josey Guano Co., Tarboro, N. C.—

Josey's 16 Per Cent Acid Phosphate.....	16.00	....	....
Josey's 14 Per Cent Acid Phosphate.....	14.00	....	....
Josey's Bone and Potash.....	10.00	....	4.00
Josey's Truck Guano.....	8.00	4.10	5.00
Josey's 8-4-4 C. S. Meal and Fish Scrap Guano	8.00	3.30	4.00
Josey's Best C. S. Meal and Fish Scrap Guano	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Josey's Tip Top C. S. Meal and Fish Scrap Tobacco Guano	8.00	2.47	3.00
Josey's Favorite C. S. Meal and Fish Scrap Guano	8.00	2.05	2.50
Josey's C. S. Meal Guano.....	8.00	1.65	2.00
Josey's Truck Guano.....	7.00	5.76	....
Josey's Peanut Guano.....	5.50	1.23	5.50
Nitrate of Soda.....	....	15.50	....
Josey's XX Top Dresser.....	....	7.40	4.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>Latta Gin and Manufacturing Co., Latta, S. C.—</i>			
Latta High Grade.....	8.00	2.47	3.00
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's 4½-45 Bone Meal.....Total	20.59	3.70	....
Lister's Standard Pure Bone Superphosphate of Lime	9.00	1.65	2.00
Lister's Ammoniated Dissolved Bone Phos- phate	8.00	2.06	2.00
Lister's Ammoniated Dissolved Bone Phos- phate	8.00	2.06	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
<i>A. S. Lee & Sons Co. (Inc.), Richmond, Va.—</i>			
Thomas' Basic Slag.....Total	15.00	....	....
Lee's Corn Fertilizer.....	10.00	....	2.00
Lee's Wheat Fertilizer.....	10.00	....	2.00
Lee's Bone and Potash.....	9.00	....	4.00
Lee's Natural Tobacco Grower.....	8.00	1.65	2.00
<i>Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.—</i>			
Acid Phosphate	16.00	....	....
Gold Dollar	8.00	3.30	4.00
Stanby	8.00	3.30	4.00
Cottonaid	8.00	2.47	3.00
Silver Dollar.....	8.00	2.47	3.00
Home Run.....	4.00	6.58	4.00
Genuine German Kainit.....	....	....	12.00
<i>John F. McNair, Laurinburg, N. C.—</i>			
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>E. H. & J. A. Meadows Co., New Bern, N. C.—</i>			
Diamond Acid Phosphate.....	16.00	....	....
Meadows' Diamond Acid Phosphate.....	14.00	....	....
Meadows' Dissolved Bone and Potash Com- pound	10.00	....	2.00
Meadows' Lobos Guano.....	8.00	4.11	5.00
Meadows' Ideal Tobacco Guano.....	8.00	3.29	4.00
Brooks' Special Tobacco Grower.....	8.00	2.47	5.00
Parker's Special Tobacco Guano.....	8.00	2.47	4.00
Dixon's High Grade Tobacco Guano.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Meadows' Gold Leaf Tobacco Guano.....	8.00	2.47	3.00
Meadows' Roanoke Guano.....	8.00	2.05	3.00
Meadows' All Crop Guano.....	8.00	2.05	2.50
Meadows' Cotton Guano.....	8.00	1.64	2.00
Hookerton Cotton Guano.....	8.00	1.64	2.00
Meadows' Great Cabbage Guano.....	7.00	5.76	7.00
Meadows' Great Potato Guano.....	7.00	4.11	8.00
Meadows' 10 Per Cent Guano.....	6.00	8.23	2.50
Meadows' German Kainit.....	....	....	12.00

The Miller Fertilizer Co., Baltimore, Md.—

Ground Bone	Total	22.00	2.47	....
Miller's 16 Per Cent Acid Phosphate.....		16.00	....	....
Miller's 14 Per Cent Acid Phosphate.....		14.00	....	....
Corn and Peanut Grower.....		10.50	....	2.25
Corn and Wheat Grower.....		10.50	....	2.25
The Miller Fertilizer Co.'s 10 and 4 Per Cent.		10.00	....	4.00
Clinch		10.00	....	2.00
Trucker		8.00	4.12	5.00
No. 1 Potato and Vegetable Grower.....		8.00	3.71	7.00
Miller's Irish Potato.....		8.00	3.29	4.00
4 Per Cent Tobacco.....		8.00	3.29	4.00
Miller's 8-3-6		8.00	2.47	6.00
Standard Phosphate		8.00	2.47	3.00
Tobacco King		8.00	2.47	3.00
Standard		8.00	2.47	3.00
Miller's High Grade.....		8.00	2.06	3.00
Harmony		8.00	2.06	3.00
Special Tobacco Grower.....		8.00	1.65	4.00
Potato and Vegetable Guano.....		8.00	1.65	4.00
Ammoniated Dissolved Bone.....		8.00	1.65	2.00
Farmers' Profit		8.00	1.65	2.00
High Grade Potato.....		6.00	4.12	7.00
Nitrate of Soda.....		....	15.05	....
Muriate of Potash.....		....	....	50.00
Sulphate of Potash.....		....	....	48.00
Kainit .....		....	....	12.00

The Mapes Formula and Peruvian Guano Co.,

143 Liberty Street, New York—

Mapes' Complete Manure, "A" Brand.....	10.00	2.47	2.50
Mapes' Corn Manure.....	8.00	2.47	6.00
Mapes' Vegetable or Complete Manure for Light Soils	6.00	4.94	6.00
Mapes' Economical Potato Manure.....	4.00	3.29	8.00

T. W. Merborn & Co., Kinston, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Genuine German Kainit.....	....	....	12.00

D. B. Martin Co., Richmond, Va.—

Pure Ground Bone.....	Total	22.00	2.46	....
Raw Bone Meal.....	Total	21.00	3.70	....
Animal Bone Potash Compound.....		16.00	1.65	2.50
Acid Phosphate		16.00	....	....
Acid Phosphate		14.00	....	....
Acid Phosphate		13.00	....	....
Pure Dissolved Animal Bone.....		12.00	1.64	....
Potash and Soluble Bone.....		12.00	....	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Potash and Soluble Bone.....	12.00	....	3.00
Acid Phosphate	12.00	....	....
Potash and Soluble Bone.....	10.00	....	6.00
Potash and Soluble Bone.....	10.00	....	5.00
Potash and Soluble Bone.....	10.00	....	4.00
Potash and Soluble Bone.....	10.00	....	3.00
Potash and Soluble Bone.....	10.00	....	2.00
Martin's Tobacco Compound.....	9.00	2.26	2.00
Dissolved Organic Compound.....	9.00	1.00	3.00
Martin's High Grade Guano.....	8.75	1.65	2.00
Blood, Bone and Potash.....	8.00	4.10	7.00
Red Star Brand Fertilizer.....	8.00	4.10	5.00
Cotton and Tobacco Guano.....	8.00	3.28	6.00
Martin's Cotton Guano.....	8.00	3.28	4.00
Martin's Red Star Brand.....	8.00	3.28	4.00
Martin's Blue Ribbon Brand Fertilizer.....	8.00	3.28	2.00
Martin's Tobacco Special.....	8.00	2.52	3.00
Martin's Cotton and Tobacco Guano.....	8.00	2.46	5.00
Martin's Bull Head Fertilizer.....	8.00	2.46	3.00
Martin's Special Fertilizer, S ² 15-3.....	8.00	2.26	3.00
Martin's Cotton Guano.....	8.00	2.05	1.00
Martin's Cotton and Tobacco Guano.....	8.00	1.65	5.00
Martin's Cotton and Tobacco Guano.....	8.00	1.65	3.00
Martin's Animal Organic Compound.....	8.00	1.65	3.00
Martin's Slaughter House Special.....	8.00	1.65	2.00
Martin's Wheat Special.....	8.00	1.65	2.00
Martin's Carolina Special for Tobacco.....	8.00	1.65	2.00
Martin's Carolina Cotton.....	8.00	1.65	2.00
Corn and Cereal Special.....	8.00	1.65	2.00
Old Virginia Favorite.....	8.00	1.65	2.00
Martin's Special Potato Manure.....	8.00	1.00	5.00
One-Eight-Four	8.00	1.00	4.00
Martin's Peannt Grower.....	8.00	1.00	4.00
Potash and Soluble Bone.....	8.00	....	20.00
Potash and Soluble Bone.....	8.00	....	4.00
Martin's Top Dresser.....	7.00	8.22	2.50
Martin's Gilt Edge Potato Manure.....	7.00	2.46	10.00
Martin's Claremont Vegetable Grower.....	7.00	2.46	5.00
Martin's 7 Per Cent Guano.....	6.00	5.74	5.00
Martin's Animal Bone Potash Guano.....	6.00	4.10	7.00
Martin's Early Truck and Vegetable Grower.....	6.00	3.28	8.00
Knowles' Special	6.00	3.28	6.00
Martin's Top Dresser.....	5.00	8.22	2.50
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Marietta Fertilizer Co., Atlanta, Ga.—

Marietta XXXX High Grade Acid Phosphate.	16.00
Marietta High Grade Acid Phosphate.....	14.00	....	....
Langford's Special.....	10.00	1.65	4.00
Cooper's High Grade Guano.....	10.00	1.65	2.00
Fish Compound	10.00	1.65	2.00
Royal Seal Guano.....	10.00	1.65	2.00
Tonawando Guano	10.00	1.65	2.00
Marietta Potash Special.....	10.00	....	4.00
Dissolved Bone Potash.....	10.00	....	2.00
Marietta Cotton Grower.....	9.00	2.47	3.00
Marietta Boll Producer.....	9.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Marietta Fertilizer, No. 844.....	8.00	3.30	4.00
Marietta Tobacco Special.....	8.00	2.47	3.00
Marietta Fertilizer, No. 833.....	8.00	2.47	3.00
Marietta Fertilizer, No. 836.....	8.00	2.47	6.00
Marietta Best for Tobacco.....	8.00	2.06	3.00
Marietta Sweet Potato Special.....	8.00	2.06	3.00
Marietta Special Potato.....	8.00	1.65	10.00
Marietta Fruit and Root Special.....	8.00	1.65	5.00
Marietta Fertilizer, No. 823.....	8.00	1.65	3.00
Marietta Guano.....	8.00	1.65	2.00
Marietta Manure Substitute.....	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit.....	....	....	12.00

Marsh-Lee & Co., Marshville, N. C.—

Marsh's Acid.....	16.00
Marsh's Acid.....	14.00	....	....
Marsh's Special High Grade.....	8.00	2.47	3.00
Marsh's Cotton Fertilizer.....	8.00	1.65	2.00
Marsh's Guano for Corn.....	8.00	1.65	2.00

The MacMurphy Co., Charleston, S. C.—

High Grade Acid Phosphate, 14 Per Cent....	14.00	....	....
Acid Phosphate.....	13.00	....	....
Acid Phosphate and Potash.....	10.00	....	5.00
Acid Phosphate and Potash.....	10.00	....	4.00
Acid Phosphate and Potash.....	10.00	....	2.00
Wilcox & Gibbs Co.'s Manipulated Guano....	9.00	2.26	2.00
Special Cotton and Corn 8.75-2.3.....	8.75	1.65	2.00
Special 8-4-6 Guano.....	8.00	3.29	6.00
Special 8-4-4 Cotton Guano.....	8.00	3.29	4.00
Special 8-4-4 Tobacco Guano.....	8.00	3.29	4.00
Special 8-3-3 Cotton and Corn.....	8.00	2.47	3.00
Special 8-3-3 Tobacco Guano.....	8.00	2.47	3.00
Standard 8-2½-1 Guano.....	8.00	2.06	1.00
Special 8-2-2 Guano.....	8.00	1.65	2.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Pure German Kainit.....	....	....	12.00

Marlboro Fertilizer Co., Bennettsville, S. C.—

Marlboro Perfection Acid Phosphate.....	16.00
Marlboro High Grade Acid Phosphate.....	14.00	....	....
Marlboro Standard Acid Phosphate.....	13.00	....	....
Marlboro Perfection 8-4-4.....	8.00	4.00	4.00
Marlboro Special 8-4-4.....	8.00	4.00	4.00
Marlboro High Grade 8-3-3.....	8.00	3.00	3.00
Marlboro Excelsior 8-3-3.....	8.00	3.00	3.00
Marlboro Complete Fertilizer.....	7.00	3.00	12.00
Marlboro Fertilizer Co.'s Special Top Dresser.	4.00	10.00	3.00
Marlboro County Top Dresser.....	....	9.00	3.00
Marlboro German Kainit.....	....	....	12.00

*Martin & White Co., Norfolk, Richmond and
Baltimore—*

Phosphate and Potash.....	12.00	....	5.00
Phosphate and Potash.....	12.00	....	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Phosphate and Potash.....	10.00	....	5.00
Phosphate and Potash.....	10.00	....	4.00
Phosphate and Potash.....	10.00	....	2.00
H. G. Cotton and Tobacco Guano.....	8.00	3.28	4.00
Manure Substitute	8.00	3.28	4.00
Horse Shoe Brand.....	8.00	2.46	3.00
Organic Cotton Grower.....	8.00	2.46	3.00
Fish Guano	8.00	1.65	3.00
Fruit Special	8.00	1.65	2.00
Big Crop Grower.....	8.00	1.65	2.00
Special Peanut Grower.....	8.00	1.05	4.00
Royal Crop Grower.....	8.00	1.00	4.00
Blood, Bone and Potash.....	7.00	4.10	8.00
Special Seven Per Cent Trucker.....	6.00	5.74	5.00
Special Potato Grower.....	6.00	4.10	7.00
Virginia Trucker	6.00	3.38	4.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

North Carolina Cotton Oil Co., Wilmington, N. C.—

High Grade Acid Phosphate.....	16.00	....	....
Acid Phosphate	14.00	....	....
Wilmington Mortgage Lifter.....	9.00	2.27	2.00
Wilmington Prolific Crop Grower.....	9.00	2.27	2.00
Wilmington's Pride	8.00	4.12	7.00
Wilmington's Truck Grower.....	8.00	3.30	4.00
Bullock's High Grade.....	8.00	3.29	4.00
Wilmington Full Value.....	8.00	3.29	4.00
Best Tobacco Grower.....	8.00	2.47	7.50
John's Special	8.00	2.47	4.00
Bullock's Cotton Grower	8.00	2.47	4.00
Wilmington Farmer Boy.....	8.00	2.47	4.00
The Stone Company Special.....	8.00	2.47	3.00
Clute's Cotton Grower.....	8.00	2.47	3.00
Wilmington Leader	8.00	2.47	3.00
Wilmington High Grade.....	8.00	2.47	3.00
L. P. B. Special.....	8.00	2.47	3.00
Lewis' Special	8.00	2.47	3.00
Carter's Lifter	8.00	2.47	3.00
Wilmington Standard	8.00	2.47	2.50
Pate's Special	8.00	2.47	2.00
Currie's Crop Grower.....	8.00	2.06	4.00
Wilmington Tobacco Grower.....	8.00	2.06	3.00
Wilmington Banner	8.00	1.65	3.00
Clark's Special	8.00	1.65	3.00
Wilmington Cotton Grower.....	8.00	1.65	2.00
Wilmington Special	8.00	1.65	2.00
Wilmington Headlight	6.00	3.29	8.00
Wilmington High Grade Top Dresser.....	4.50	7.40	3.00
Nitrate of Soda.....	....	14.85	....
Wilmington Special Top Dresser.....	....	7.40	3.00
Muriate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

North Carolina Cotton Oil Co., Raleigh, N. C.—

Raleigh Standard Guano.....	8.00	2.26	2.00
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Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>North Carolina Cotton Oil Co., Charlotte, N. C.—</i>			
Dixie Standard	8.00	2.48	3.00
Majestic	8.00	1.65	2.00
<i>North Carolina Cotton Oil Co., Henderson, N. C.—</i>			
Two in One.....	10.00	3.28	4.00
Henderson Tobacco Fertilizer.....	9.00	2.47	3.00
Franklin Tobacco Fertilizer.....	9.00	2.47	3.00
Pride of Vance Tobacco Fertilizer.....	9.00	2.47	3.00
Unedit Tobacco Fertilizer.....	9.00	2.47	3.00
Two in One.....	8.00	3.29	4.00
McKinne Mixture	8.00	2.26	3.25
Brewer's Special	8.00	2.26	2.00
Henderson Cotton Grower.....	8.00	1.65	2.00
Franklin Cotton Grower.....	8.00	1.65	2.00
Unedit Cotton Grower.....	8.00	1.65	2.00
Vance Cotton Grower.....	8.00	1.65	2.00
<i>Nitrate Agencies Co., New York, Baltimore, Savannah, Charleston and Norfolk—</i>			
Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Nitrate of Soda, 95 Per Cent.....	....	15.65	....
Nitrate of Soda.....	....	15.50	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00
<i>New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Special Corn and Peanut Grower.....	11.00	....	2.00
High Grade Bone and Potash.....	10.00	....	4.00
Carteret Bone and Potash.....	10.00	....	2.00
Oriole Tobacco Grower.....	8.00	3.30	4.00
Harvey's Special Meal and Fish Guano.....	8.00	2.47	3.00
Foy's High Grade Fertilizer.....	8.00	2.47	3.00
Lenoir Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Pitt's Prolific Golden Tobacco Guano.....	8.00	2.47	3.00
Favorite Cotton Grower.....	8.00	2.27	2.00
Ouslow's Farmers' Reliance Guano.....	8.00	2.06	3.00
Jones County Premium Crop Grower.....	8.00	2.06	3.00
Craven Cotton Guano.....	8.00	1.65	2.00
Greene County Standard Fertilizer.....	8.00	1.65	2.00
Dunn's Standard Truck Grower.....	7.00	5.77	7.00
Ives' Irish Potato Guano.....	7.00	4.12	7.00
Eureka Tobacco Fertilizer.....	6.00	3.30	7.00
Pamlico Electric Top Dresser.....	5.00	8.25	2.50
Wooten's Special Tobacco Guano.....	4.00	3.30	6.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	15.67	....
High Grade Fish Scrap.....	....	8.25	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Norfolk Fertilizer Co., Norfolk, Va.—</i>			
Pure Ground Bone.....Total	20.00	3.70	....
Oriana 16 Per Cent Acid Phosphate.....	16.00	....	....
Whitney High Grade Acid Phosphate.....	16.00	....	....
Oriana 14 Per Cent Acid Phosphate.....	14.00	....	....
Oriana Wheat Grower.....	10.00	....	4.00
Shenandoah Wheat Mixture.....	10.00	....	3.00
Young's Grain Grower.....	10.00	....	2.00
Oriana Bone and Potash.....	10.00	....	2.00
Oriana C. S. M. Special.....	9.00	2.26	2.00
Oriana Complete Fertilizer	8.00	3.29	4.00
Oriana First Step Tobacco Guano.....	8.00	3.29	4.00
Oriana Tobacco Guano.....	8.00	2.47	3.00
Oriana for Cotton.....	8.00	2.47	3.00
Oriana Cotton Guano.....	8.00	1.65	2.00
Oriana Crop Grower.....	8.00	1.65	2.00
Mayodan Valley Wheat Grower.....	8.00	....	4.00
Oriana Special Mixture.....	6.00	4.11	5.00
Oriana Truck Guano.....	5.00	5.76	5.00
Pine Top Special Crop Grower.....	5.00	1.65	6.00
H. G. Tobacco Guano.....	4.00	3.29	6.00
Nitrate of Soda Mixture for Top Dressing			
Cotton	2.00	8.23	....
Nitrate of Soda .....	....	15.00	....
Ground Fish .....	....	8.23	....
Animal Tankage .....	....	5.76	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00
<i>Navassa Guano Co., Wilmington, N. C.—</i>			
Navassa Acid Phosphate.....	17.00	....	....
Navassa Acid Phosphate.....	16.00	....	....
Navassa 14 Per Cent Acid Phosphate.....	14.00	....	....
Navassa Dissolved Bone.....	13.00	....	....
Navassa Special Wheat Mixture.....	12.00	....	4.00
Navassa Gray Land Mixture.....	12.00	....	4.00
Navassa Acid Phosphate.....	12.00	....	....
Maxim Guano	10.00	2.47	2.00
Corona Guano	10.00	1.65	2.00
Navassa Wheat and Grass Grower.....	10.00	....	4.00
Navassa Wheat Mixture.....	10.00	....	2.25
Navassa Dissolved Bone with Potash.....	10.00	....	2.00
Navassa Fish Guano.....	9.00	2.47	3.00
Navassa Manipulated Guano.....	9.00	2.26	2.00
Osceola Guano	9.00	1.65	3.00
Harvest Queen Fertilizer.....	9.00	1.65	2.00
Navassa Complete Fertilizer.....	9.00	1.65	1.00
Farmers' Special Mixture.....	8.75	2.25	4.00
Navassa Universal Fertilizer.....	8.50	2.06	1.00
Coree Tobacco Guano.....	8.00	3.29	4.00
Navassa High Grade Fertilizer.....	8.00	3.29	4.00
Navassa Special Truck Guano.....	8.00	3.20	4.00
Navassa Carib Guano.....	8.00	2.47	10.00
Navassa Blood and Meal Mixture.....	8.00	2.47	5.00
Orton Guano	8.00	2.47	4.00
Navassa High Grade Guano.....	8.00	2.47	3.00
Clarendon Tobacco Guano.....	8.00	2.47	3.00
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8.00	2.47	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Navassa Strawberry Top Dressing.....	8.00	2.06	4.00
Mogul Guano	8.00	2.06	3.00
Navassa Guano for Tobacco.....	8.00	2.06	2.00
Ammoniated Soluble Navassa Guano.....	8.00	2.06	2.00
Brooks' Ammoniated Guano.....	8.00	2.06	1.50
Navassa Fruit Grower Fertilizer.....	8.00	1.65	6.00
Harvest King Guano.....	8.00	1.65	3.00
Clark's Special Cotton-seed Meal Guano.....	8.00	1.65	3.00
Navassa Grain Fertilizer.....	8.00	1.65	2.00
Navassa Cotton-seed Meal Guano.....	8.00	1.65	2.00
Navassa Cotton Fertilizer.....	8.00	1.65	2.00
Oceoneehee Tobacco Guano.....	8.00	1.65	2.00
Navassa Dissolved Bone with Potash.....	8.00	....	4.00
Navassa Lettuce Grower Fertilizer.....	7.00	7.00	7.00
Navassa Root Crop Fertilizer.....	7.00	4.12	7.00
Navassa Creole Guano.....	6.00	4.12	7.00
Navassa H. G. Top Dresser.....	4.00	7.82	4.00
Navassa Top Dresser.....	4.00	6.17	2.50
Sulphate of Ammonia.....	....	20.59	....
Nitrate of Soda.....	....	14.82	....
Blood .....	....	13.15	....
Fish Scrap .....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

G. Ober & Sons Co., Baltimore, Md.—

Pure Raw Bone Meal.....Total	21.00	3.71	....
Ober's High Grade Acid Phosphate.....	16.00	....	....
Ober's Dissolved Bone Phosphate.....	14.00	....	....
Ober's Standard Potash Compound.....	12.00	....	5.00
Ober's Dissolved Animal Bone.....	10.00	2.47	....
Ober's Dissolved Bone, Phosphate and Potash.....	10.00	....	2.00
Ober's Special High Grade Fertilizer.....	9.00	2.47	3.00
Ober's Special Ammoniated Dissolved Bone...	9.00	1.65	2.00
Ober's Farmers' Mixture.....	9.00	.82	2.00
Ober's H. G. Fertilizer.....	8.00	3.30	4.00
Ober's Special Compound for All Crops.....	8.00	2.47	3.00
Ober's Special Compound for Tobacco.....	8.00	2.47	3.00
Cooper's Pungo Guano.....	8.00	2.06	2.00
Ober's Standard Tobacco Fertilizer.....	8.00	1.65	2.00
Ober's Special Cotton Compound.....	8.00	1.65	2.00
Ober's Soluble Ammoniated Superphosphate of Lime	8.00	1.65	2.00
Ober's Stag Guano.....	8.00	.82	4.00
Ober's Acid Phosphate with Potash.....	8.00	....	4.00
Ground Fish	6.87	9.49	....
Ober's Complete Fertilizer.....	6.00	4.12	6.00
Ober's Special Potash Compound for Tobacco.....	6.00	2.47	7.00
Ober's Special Tobacco Bed Fertilizer, 10 Per Cent	4.00	8.25	3.00
Nitrate of Soda.....	....	15.50	....
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Old Buck Guano Co., Richmond, Va.—

Old Buck Quincy Tobacco and Garden.....	8.00	2.47	3.00
Saxon	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Pocomoke Guano Co., Norfolk, Va.—</i>			
Pure Ground Bone.....Total	20.00	3.70	....
Superb Acid Phosphate.....	16.00	....	....
Peerless Acid Phosphate.....	14.00	....	....
Pocomoke 12-5 Bone and Potash.....	12.00	....	5.00
Alkali Bone	11.00	....	2.00
Pocomoke Bone and Potash Mixture.....	10.00	....	4.00
10-2 Potash Mixture.....	10.00	....	2.00
Monticello Animal Bone Fertilizer.....	9.00	1.85	4.00
Cinco Tobacco Guano.....	8.50	2.06	2.50
Pocomoke Superphosphate	8.50	1.65	2.00
Electric Crop Grower.....	8.50	1.65	2.00
Garrett's Grape Grower.....	8.00	3.29	10.00
Faultless Ammoniated Superphosphate.....	8.00	3.29	4.00
Pocomoke Sweet Potato Grower.....	8.00	2.47	3.00
Harvey's High Grade Monarch.....	8.00	2.47	3.00
Monarch Tobacco Grower.....	8.00	2.47	3.00
C. C. C. (Crescent Complete Compound).....	8.00	1.65	3.00
Panlico Superphosphate	8.00	1.65	2.00
Pocomoke Wheat, Corn and Peanut Manure..	8.00	1.00	4.00
Pocomoke Defiance Bone and Potash.....	8.00	....	4.00
Standard Truck Guano.....	7.00	4.11	5.00
Freeman's 7 Per Cent Irish Potato Grower...	6.00	5.76	5.00
Seaboard Popular Trucker.....	6.00	5.76	5.00
Coast Line Truck Guano.....	5.00	8.23	3.00
Smith's Special Formula.....	4.00	3.29	6.00
Nitrate of Soda.....	....	15.00	....
Ground Fish .....	....	8.23	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Peruvian Guano Corporation, Charleston, S. C.—

Peruvian Guano Ex. S. S. Caithness-shire....	18.00	3.08	2.40
Acid Phosphate	16.00	....	....
Peruvian Guano Ex. S. S. Chipana.....	14.00	3.29	2.00
Peruvian Guano Ex. S. S. Condor.....	14.00	2.46	2.00
Peruvian Guano Ex. S. S. Belle of Scotland..	14.00	2.14	1.70
Acid Phosphate	14.00	....	....
Peruvian Guano Ex. S. S. Capac.....	13.00	4.93	2.00
Acid Phosphate	13.00	....	....
Peruvian Guano Ex. S. S. Chipana "Lobos Isl".	12.00	2.88	2.00
Peruvian Guano Ex. S. S. Chipana "Bellestas".	11.00	6.78	2.75
Peruvian Guano Ex. S. S. Chipana "Smith Isl".	11.00	5.76	2.00
Peruvian Guano Ex. S. S. Belle of Scotland...	10.00	4.11	2.00
"Chincha Island" High Grade Peruvian Mix- ture	10.00	3.29	4.00
"Penguin" Peruvian Compound.....	10.00	2.46	3.00
"Albatross" Peruvian Formula.....	10.00	1.64	4.00
Peruvian Top Dresser.....	8.00	6.99	3.50
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	14.80	....
Dried Blood .....	....	13.10	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Pamlico Chemical Co., Washington, N. C.—

Bissett's Special Cotton Grower.....	9.00	2.06	4.00
Pamlico 16 Per Cent Acid Phosphate.....	16.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Pamlico Bone Phosphate.....	14.00	....	....
Martin County Peanut Grower.....	10.00	1.23	4.00
Pamlico Peanut Guano.....	10.00	....	4.00
Dissolved Bone and Potash.....	10.00	....	2.00
Pitt County High Grade Tobacco Guano.....	9.00	2.88	10.00
Blount's Special Cotton Grower.....	9.00	2.27	2.00
Prosperity Cotton Grower.....	9.00	2.26	2.00
United States High Grade Tobacco Guano....	8.00	4.12	10.00
Cowell's Great Potato Grower.....	8.00	4.12	7.00
Pamlico 8-4-4 Guano.....	8.00	3.30	4.00
Bull's Eye Tobacco Grower.....	8.00	3.30	4.00
Early Sweet Potato.....	8.00	2.47	10.00
Pamlico High Grade Tobacco Grower.....	8.00	2.47	5.00
Success Guano	8.00	2.47	3.00
Blount's Special Tobacco Grower.....	8.00	2.47	3.00
Tobacco Growers' Friend.....	8.00	2.47	3.00
Fountain's Special Guano.....	8.00	2.26	4.50
Farmers' Best Guano.....	8.00	2.06	3.00
Pamlico Bone and Fish Guano.....	8.00	1.65	2.00
Pamlico Cotton Guano.....	8.00	1.65	2.00
Pamlico 7-7-7 Guano.....	7.00	5.77	7.00
Pamlico Special Irish Potato Guano.....	7.00	4.12	7.00
Pamlico Special Sweet Potato Guano.....	7.00	4.12	5.00
Pamlico Favorite Guano.....	7.00	4.12	5.00
Blount's H. G. Potato Grower.....	7.00	4.12	5.00
Faulkland H. G. Tobacco Guano.....	6.00	2.47	6.00
Acidulated Fish Scrap.....	5.50	7.82	....
Cowell's Great Cabbage Grower.....	5.00	8.25	2.50
4-3-5 Guano	4.00	2.47	5.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Pamlico Ground Fish.....	....	8.25	....
Sulphate of Potash.....	....	....	55.00
Muriate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

*Planters Fertilizer and Phosphate Co., Charleston,
S. C.*

16 Per Cent Acid Phosphate.....	16.00	....	....
Planters' High Grade Acid Phosphate.....	14.00	....	....
Excelsior H. G. Acid Phosphate.....	14.00	....	....
Planters' Soluble Bone.....	13.00	....	....
Planters' Bone and Potash.....	12.00	....	1.00
Acid and Potash.....	10.00	5.76	5.00
Planters' Special Meal Mixture.....	10.00	1.65	2.00
Planters' Grain Grower.....	10.00	.82	3.00
Special Mixture	10.00	....	5.00
Planters' Acid and Potash.....	10.00	....	4.00
Planters' Bone and Potash.....	10.00	....	2.00
Planters' Blood and Fish Guano.....	9.00	1.65	3.00
Planters' Special Mixture.....	9.00	.82	3.00
Planters' Special Mixture.....	8.00	4.12	5.00
Planters' Special Cotton Fertilizer.....	8.00	3.29	4.00
Planters' Bright Tobacco Fertilizer.....	8.00	3.29	4.00
Special Mixture	8.00	2.50	3.00
Planters' Cotton and Corn Fertilizer.....	8.00	2.47	4.00
Planters' H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Planters' Soluble Guano.....	8.00	2.47	3.00
Planters' Fertilizer	8.00	2.06	2.00
Planters' Standard Fertilizer.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Planters' Bone and Potash.....	8.00	....	4.00
Special Mixture	7.00	5.76	7.00
Special Mixture	7.00	4.11	7.00
Special Mixture	7.00	4.11	5.00
Planters' H. G. Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	14.83	....
Planters' Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Planters' German Kainit.....	....	....	12.00

Planters Guano Co., Dunn, N. C.—

Uncle Zeb	9.50	2.75	5.00
Bull of the Field.....	8.00	3.00	4.00
Planters' Special	8.00	3.00	3.00
Dunn Hustler	8.00	3.00	3.00
Sampson Cotton Grower.....	8.00	2.00	2.00

Central Phosphate Co., Mount Pleasant, Tenn.—

Tennessee Phosphate Rock.....Total	28.00
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Pearsall & Co., Wilmington, N. C.—

Pearsall's H. G. Acid Phosphate.....	16.00
Pearsall's H. G. Acid Phosphate.....	14.00
Pearsall's Bone and Potash.....	10.00	....	4.00
Days' Special	8.00	3.29	4.00
Fish and Potash Compound.....	8.00	3.29	4.00
Bone Meal and Fish.....Total	8.00	3.29	4.00
Pearsall's Berry Guano.....	8.00	2.47	10.00
Pearsall's Useme Guano.....	8.00	2.47	3.00
Pearsall's High Grade Tobacco.....	8.00	2.47	3.00
Pearsall's F. F. F. G.....	8.00	2.47	3.00
Currie's Cotton and Corn Guano.....	8.00	1.65	3.00
Pearsall's Corn Guano.....	8.00	1.65	3.00
Pearsall's Eagle	8.00	1.65	2.00
Pearsall's Potato and Truck Guano.....	6.00	4.12	7.00
Nitrate of Soda.....	....	14.85	....
Nitrate of Soda.....	....	14.80	....
Ground Fish .....	....	8.22	....
Pearsall's Top Dresser.....	....	7.42	3.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pacific Guano Co., Charleston, S. C.—

Standard Pacific Acid Phosphate.....	12.00	....	....
Standard Soluble Pacific Guano.....	8.50	1.65	2.00
High Grade Pacific Fertilizer.....	8.00	2.46	3.00

Powhatan Chemical Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone Meal.....Total	22.50	3.70	....
Magic Dissolved Bone Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
Powhatan Acid Phosphate.....	13.00	....	....
Magic Corn Special.....	12.00	1.00	2.00
High Grade Bone and Potash Mixture.....	12.00	....	5.00
Virginia Dissolved Bone.....	12.00	....	....
Magic Corn Grower.....	10.00	.82	1.00
Magic Corn Grower.....	10.00	.82	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Magic Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Guilford Special Tobacco Fertilizer.....	9.00	2.47	6.00
Ralling's Special Fertilizer.....	9.00	2.47	2.00
Economic Cotton Grower.....	9.00	2.26	2.00
Johnson's Best Fertilizer.....	9.00	2.06	5.00
Holt's Magic Fertilizer.....	9.00	2.06	5.00
Union Magic Fertilizer.....	9.00	1.85	4.00
North Carolina Favorite.....	9.00	1.65	3.00
Powhatan Special Fertilizer.....	9.00	1.65	2.00
Magic Mixture	9.00	1.65	1.00
Magic Wheat Grower.....	9.00	.82	2.00
King Trucker	8.00	4.11	5.00
Tomlinson's Best Fertilizer.....	8.00	3.70	7.00
Copeland's Magic Fertilizer.....	8.00	3.29	8.00
North State Special.....	8.00	3.29	4.00
Tomlinson's Favorite Fertilizer.....	8.00	2.88	5.00
Tomlinson's Special Fertilizer.....	8.00	2.47	5.00
Magic Fertilizer	8.00	2.47	4.00
Johnson's Special Fertilizer.....	8.00	2.47	3.00
P. C. Co.'s Hustler.....	8.00	2.47	3.00
King Brand Fertilizer.....	8.00	2.06	3.00
White Leaf Tobacco Fertilizer.....	8.00	2.06	3.00
Powhatan Peanut Fertilizer.....	8.00	1.65	4.00
Magic Cotton Grower.....	8.00	1.65	2.00
Magic Special Fertilizer.....	8.00	1.65	2.00
Magic Tobacco Grower.....	8.00	1.65	2.00
Magic Peanut Special.....	8.00	.82	4.00
Magic Peanut Grower.....	8.00	....	4.00
Magic Grain and Grass Grower.....	8.00	....	4.00
Powhatan Bone and Potash Mixture.....	8.00	....	4.00
Powhatan Trucker	7.00	4.94	5.00
Copeland's Special Fertilizer.....	6.00	3.29	7.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Pine Level Oil Mill Co., Pine Level, N. C.—

Pine Level 16 Per Cent Acid Phosphate.....	16.00
Pine Level 14 Per Cent Acid Phosphate.....	14.00	....	....
Bone and Potash Mixture.....	10.00	....	4.00
Sutton's Potato Guano.....	9.00	2.88	5.00
Xantho Tobacco Guano.....	8.00	3.30	4.00
Oliver's Truck Grower Guano.....	8.00	3.30	4.00
Hale's Special for Tobacco.....	8.00	2.47	4.00
Pine Level High Grade.....	8.00	2.47	3.00
Cotton Grower for All Crops.....	8.00	1.65	2.00
H. G. Top Dresser.....	3.00	6.03	6.00
Nitrate of Soda.....	....	15.22	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Patapsco Guano Co., Baltimore, Md.—

Patapsco Pure Ground Bone.....Total	20.59	3.70	....
Florida Soluble Phosphate.....	16.00	....	....
Patapsco Pure Dissolved S. C. Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Patapsco High Grade Phosphate and Potash..	11.00	....	5.00
Baltimore Soluble Phosphate.....	11.00	....	2.00
Patapsco 10 and 4 Potash Mixture.....	10.00	....	4.00
Patapsco Soluble Phosphate and Potash.....	10.00	....	2.00
Patapsco Guano for Tobacco.....	9.25	2.06	2.00
Tankage Total	9.15	7.41	....
Patapsco Tobacco Fertilizer.....	9.00	2.47	3.00
Patapsco Cotton and Corn Special.....	9.00	2.06	5.00
Patapsco Guano	9.25	2.06	2.00
Coon Brand Guano.....	9.00	.82	3.00
Patapsco Cotton and Tobacco Special.....	8.00	3.29	4.00
Patapsco Plant Food for Tobacco, Potatoes and Truck	8.00	2.47	5.00
Choctaw Guano	8.00	2.47	3.00
Patapsco Special Tobacco Mixture.....	8.00	2.06	3.00
Unicorn Guano	8.00	2.06	3.00
Swanson's Gold Leaf Special.....	8.00	2.06	2.00
Planters' Favorite	8.00	1.65	2.00
Sea Gull Ammoniated Guano.....	8.00	1.65	2.00
Grange Mixture	8.00	1.65	2.00
Patapsco 7-7-7 Truck Guano.....	7.00	5.76	7.00
Patapsco Trucker for Early Vegetables.....	7.00	4.11	5.00
Money Maker Guano.....	7.00	3.70	6.00
Ground Fish Total	6.00	8.23	....
Patapsco Potato Guano.....	6.00	4.11	7.00
Patapsco Crop Dresser.....	4.00	3.29	4.00
Sulphate of Ammonia.....	....	20.16	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pocahontas Guano Co., Lynchburg, Va.—

Fine Ground Bone Meal..... Total	23.00	2.47	....
Pure Raw Bone Meal..... Total	22.00	3.71	....
Pure Raw Bone Meal..... Total	22.00	3.71	....
Carrington's S. C. Phosphate, Waukesha Brand	16.00	....	....
Imperial Dissolved S. C. Phosphate.....	14.00	....	....
Wabash Wheat Mixture.....	10.00	....	4.00
Carrington's Superior Grain Compound.....	10.00	....	2.00
Pocahontas Special Tobacco Fertilizer.....	9.00	2.47	3.00
High Grade 4 Per Cent Tobacco Compound, Mohawk King	9.00	1.85	4.00
Yellow Tobacco Special.....	9.00	1.65	2.00
Standard Tobacco Guano, Old Chief Brand...	9.00	1.65	2.00
Indian Tobacco Grower.....	8.00	2.47	4.00
Farmers' Favorite Apex Brand.....	8.00	2.47	3.00
Special Truck Grower, Eagle Mount Brand...	8.00	2.06	6.00
Spot Cash Tobacco Compound.....	8.00	2.06	3.00
Carrington's Banner Brand Guano.....	8.00	1.65	2.00
A. A. Complete Champion Brand.....	8.00	1.00	3.00
Cherokee Grain Special.....	8.00	....	4.00

Planters Cotton Seed Oil Co., Rocky Mount, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Royal Cotton Grower.....	9.00	2.26	2.00
Gorham H. G. Guano.....	8.00	3.29	4.00
Tar River Special.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Planters' C. S. Oil Co.'s Tobacco Guano.....	8.00	2.47	3.00
Planters' C. S. Oil Co.'s Cotton Guano.....	8.00	1.65	2.00
Eagle Guano	8.00	1.65	2.00
Planters' Special Potato Guano.....	7.00	4.12	5.00
E. L. D. Special.....	7.00	2.47	3.00
Braswell's Special for Tobacco.....	7.00	2.26	3.50
Planters' Top Dresser.....	3.50	7.82	3.00
Nitrate of Soda.....	.....	15.65	.....
Ground Fish Scrap.....	.....	8.23	.....
Muriate of Potash.....	.....	.....	50.00
Sulphate of Potash.....	.....	.....	48.00
Genuine German Kainit.....	.....	.....	12.00

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Piedmont Bone Meal.....Total	21.00	3.29
Piedmont 16 Per Cent Acid Phosphate.....	16.00	.....	.....
Piedmont 14 Per Cent Acid Phosphate.....	14.00	.....	.....
Piedmont Special Potash Mixture.....	10.00	.....	5.00
Levering's Potashed Bone.....	10.00	.....	4.00
Piedmont Farmers' Bone and Potash.....	10.00	.....	2.00
Piedmont Farmers' Standard.....	9.00	1.65	2.00
Piedmont Essential Tobacco Compound.....	9.00	1.65	2.00
Piedmont Farmers' Cotton Grower.....	9.00	.82	3.00
Levering's Ammoniated Bone.....	9.00	.82	3.00
Piedmont Special Farmers' Tobacco Guano...	8.40	2.47	4.00
Piedmont General Truck Grower.....	8.00	4.12	5.00
Piedmont 4-8-10 Guano.....	8.00	3.29	10.00
Piedmont Unexcelled Guano.....	8.00	3.29	4.00
Piedmont High Grade Ammoniated Bone and Potash	8.00	2.47	3.00
Piedmont High Grade Guano for Cotton.....	8.00	2.47	3.00
Levering's Reliable Tobacco Guano.....	8.00	2.47	3.00
Piedmont Guano for Tobacco.....	8.00	2.06	3.00
Piedmont Guano for All Crops.....	8.00	2.06	3.00
Levering's Standard	8.00	1.65	3.00
Piedmont Bone and Peruvian Mixture.....	8.00	1.65	2.00
Piedmont Special for Cotton, Corn and Pea- nuts	8.00	1.65	2.00
Piedmont Red Leaf Tobacco Guano.....	8.00	1.65	2.00
Piedmont Cultivator Brand.....	8.00	1.65	2.00
Piedmont Farmers' Favorite.....	8.00	.82	4.00
Piedmont Star Bone and Potash.....	8.00	.....	5.00
Piedmont 7-7-7 Truck Guano.....	7.00	5.76	7.00
Piedmont 5-7-8 Guano.....	7.00	4.12	8.00
Piedmont 5-7-5 Guano.....	7.00	4.12	5.00
Piedmont Special Truck Fertilizer.....	6.00	5.76	7.00
Piedmont Special Potato Guano.....	6.00	4.94	7.00
Piedmont Early Vegetable Manure.....	6.00	4.12	7.00
Piedmont Early Trucker.....	6.00	4.12	5.00
Piedmont Vegetable Compound.....	6.00	3.29	8.00
Piedmont Potato Producer.....	5.00	2.47	6.00
Sulphate of Ammonia.....	.....	20.58	.....
Nitrate of Soda.....	.....	15.22	.....
Boykin's Top Dresser.....	.....	7.41	3.00
Muriate of Potash.....	.....	.....	50.00
Sulphate of Potash.....	.....	.....	48.00

The Quinnepiac Co., Charleston, S. C.—

Standard Quinnepiac Acid Phosphate.....	13.00	.....	.....
Standard Quinnepiac Pine Island Ammoniated Superphosphate	9.00	1.85	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Robertson Fertilizer Co., Norfolk, Va.—</i>			
Robertson's Raw Bone Meal.....Total	21.00	3.71	....
High Peak Acid Phosphate.....	16.00	....	....
Scepter Brand Acid Phosphate.....	14.00	....	....
Robertson's Dissolved Bone.....	13.00	2.06	....
I. M. C. Acid Phosphate.....	13.00	....	....
J. W. S. Special Bone and Potash Mixture...	12.00	....	5.00
J. W. S. Alkaline Bone.....	10.00	....	5.00
Skyscraper Bone and Potash Compound.....	10.00	....	4.00
Level Run Dissolved Bone and Potash.....	10.00	....	2.00
J. W. S. Complete Guano.....	9.00	2.06	5.00
Beaver Brand Soluble Guano.....	9.00	1.85	4.00
Robertson's Blood and Bone Mixture.....	9.00	1.00	2.00
P. M. C. High Grade Soluble Guano.....	8.00	4.12	7.00
Wood's Winner H. G. Guano.....	8.00	3.30	4.00
Robertson's Soluble H. G. Guano.....	8.00	2.47	4.00
Robertson's Special Formula for Tobacco....	8.00	2.47	3.00
Big Cropper High Grade Guano.....	8.00	2.47	3.00
Robertson's X-(T) Tobacco Grower.....	8.00	2.06	2.00
Double Dollar Soluble Guano.....	8.00	1.65	2.00
Farmers' Bone	8.00	1.65	2.00
Ten Strike Soluble Crop Producer.....	8.00	1.00	4.00
M. C. Special Bone and Potash Mixture.....	8.00	....	4.00
Tidewater Truck Guano.....	7.00	4.12	5.00
Robertson's 5-6-7	6.00	4.12	7.00
Robertson's 7 Per Cent for Truck.....	5.00	5.77	5.00
Robertson's 10 Per Cent Truck Guano.....	2.00	8.25	2.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Fish .....	....	9.04	....
Fish Guano .....	....	8.23	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

F. S. Royster Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Royster's H. G. 17 Per Cent Acid Phosphate..	17.00	....	....
Royster's H. G. 16 Per Cent Acid Phosphate..	16.00	....	....
Royster's 14 Per Cent Acid Phosphate.....	14.00	....	....
Royster's Dissolved Bone.....	13.00	....	....
Royster's XX Acid Phosphate.....	12.00	....	....
Royster's Bone and Potash Mixture.....	11.00	....	5.00
Royster's Soluble Guano.....	10.00	1.65	2.00
Royster's 10 and 5 Bone and Potash Mixture.	10.00	....	5.00
Royster's 10 and 4 Bone and Potash Mixture.	10.00	....	4.00
Royster's Bone and Potash for Grain.....	10.00	....	3.00
Royster's Bone and Potash Mixture.....	10.00	....	2.00
M. P. F. Mixture.....	9.50	3.30	5.00
Royster's 4-9-5 Special.....	9.00	3.30	5.00
Tomlinson's Special	9.00	2.47	5.00
Royster's Meal Mixture.....	9.00	2.26	2.00
Royster's Cotton Grower.....	9.00	2.26	2.00
Watkins' Special	9.00	2.06	5.00
Haynes' Special	9.00	2.06	3.00
Viking Ammoniated Guano.....	9.00	1.65	3.00
Special Compound	9.00	1.65	1.00
Royster's Special 1-9-2 Guano.....	9.00	.82	2.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
H. B. & Co.'s Special.....	8.00	4.60	10.00
Royster's Best Guano.....	8.00	3.71	7.00
Cobb's High Grade for Tobacco.....	8.00	3.30	5.00
Trucker's Delight	8.00	3.30	4.00
Milo Tobacco Guano.....	8.00	3.00	4.00
Jupiter High Grade Guano.....	8.00	3.30	4.00
Royster's Special 4-8-3.....	8.00	3.30	3.00
Gorham's Special	8.00	3.30	2.50
Black Wrapper Special Tobacco Guano.....	8.00	3.30	2.00
Eagle's Special Tobacco Guano.....	8.00	2.47	5.00
Bonanza Tobacco Guano.....	8.00	2.47	3.00
Marlboro High Grade Cotton Guano.....	8.00	2.47	3.00
Royster's Special Sweet Potato Guano.....	8.00	2.47	3.00
Williams' Special Guano.....	8.00	2.06	5.00
Orinoco Tobacco Guano.....	8.00	2.06	3.00
Special Tobacco Compound.....	8.00	2.06	2.00
Corbett & Moore's Special.....	8.00	1.65	3.50
Royster's Special Wheat Fertilizer.....	8.00	1.65	2.00
Royster's Complete Guano.....	8.00	1.65	2.00
Farmers' Bone Fertilizer	8.00	1.65	2.00
Webb's Korn King.....	8.00	1.65	2.00
Farmers' Bone Fertilizer for Tobacco.....	8.00	1.65	2.00
Jumbo Peanut Grower.....	8.00	1.02	4.00
Royster's 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Battle's Favorite	7.25	3.91	5.25
Royster's Special 7 Per Cent Truck Guano...	7.00	5.77	7.00
Royster's Early Truck Guano.....	7.00	4.12	8.00
Royal Special Potato Guano.....	7.00	4.12	7.00
Royal Potato Guano.....	7.00	4.12	5.00
Pasquotank Potato Guano.....	7.00	3.30	8.00
Royster's Special 13 Per Cent Plant Food....	7.00	2.47	3.00
Royster's Peanut Special.....	7.00	....	5.00
Ballentine's Potato Guano.....	6.00	5.77	7.00
Arrow Potato Guano.....	6.00	5.77	5.00
Royster's Irish Potato Guano.....	6.00	4.12	7.00
Royster's Special	6.00	4.12	5.00
Oakley's Special Tobacco Guano.....	6.00	3.30	4.00
McDowell's Cotton Grower.....	6.00	3.30	2.00
Humphrey's Special for Tobacco.....	6.00	2.55	3.20
Royster's 2-6-5 Special.....	6.00	1.65	5.00
Royster's Special 21 Per Cent Plant Food....	5.50	4.52	10.00
Royster's Special 20 Per Cent Plant Food....	5.00	4.10	10.00
Wiggins' Special	5.50	3.30	3.00
Royster's Cabbage Guano.....	5.00	8.23	2.50
Royster's Special 10 Per Cent Truck Guano..	5.00	8.24	3.00
Harvey's Cabbage Guano.....	5.00	6.50	3.00
Royster's Potato Guano.....	5.00	4.94	7.00
Phillips' Special	5.00	1.65	6.00
Presto Top Dresser.....	4.00	8.22	4.00
Royster's Special Top Dresser.....	4.00	6.18	2.50
Royster's 4-6-4 Special.....	4.00	4.94	4.00
Dried Fish Scrap	3.00	9.05	....
Ground Fish Scrap.....	3.00	8.25	....
Nitrate of Soda.....	....	15.22	....
Magic Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Manure Salts .....	....	....	20.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Robersonville Guano Co., Robersonville, N. C.—</i>			
Roberson's H. G. Acid Phosphate.....	16.00	.....	.....
Roberson's H. G. Tobacco Grower.....	8.00	2.47	3.00
Roberson's H. G. Fish and Meal Guano.....	8.00	2.47	3.00
Roberson's H. G. Cotton Grower.....	8.00	2.47	3.00
Roberson's Special 7-7-7 Potato Grower.....	7.00	5.77	7.00
Roberson's H. G. Truck Guano.....	7.00	4.12	5.00
Roberson's 7 Per Cent Potato Guano.....	6.00	5.77	5.00
Roberson's Genuine German Kainit.....	.....	.....	12.00
Sulphate of Ammonia.....	.....	20.50	.....
Nitrate of Soda.....	.....	15.60	.....
Dried Blood.....	.....	13.62	.....
Fish Scrap Ground.....	.....	8.00	.....
Muriate of Potash.....	.....	.....	50.00
Sulphate of Potash.....	.....	.....	48.00
<i>Richmond Guano Co., Richmond, Va.—</i>			
Pure Animal Bone.....Total	25.00	2.47	.....
Pure Raw Bone Meal.....Total	22.50	3.70	.....
Rex Dissolved Bone Phosphate.....	16.00	.....	.....
High Grade Acid Phosphate.....	14.00	.....	.....
High Grade Wheat and Grass Fertilizer.....	14.00	.....	.....
Premium Bone and Potash Mixture.....	13.00	.....	3.00
Premium Dissolved Bone.....	13.00	.....	.....
Hunter & Dunn's Dissolved Bone.....	13.00	.....	.....
Premium Corn Special.....	12.00	1.00	2.00
H. G. Bone and Potash Mixture.....	12.00	.....	5.00
Old Homestead Dissolved Bone.....	12.00	.....	.....
Dissolved S. C. Phosphate.....	12.00	.....	.....
Premium Corn Grower.....	10.00	.82	1.00
Bone Mixture.....	10.00	.82	1.00
Johnson's Best Bone and Potash.....	10.00	.....	5.00
Rex Bone and Potash Mixture.....	10.00	.....	4.00
Bone and Potash Mixture.....	10.00	.....	2.00
Sanders' Special Formula for Bright Tobacco.	9.00	2.88	5.00
Hunter & Dunn's Special Ammoniated Fer- tilizer.....	9.00	2.47	2.25
Collins' Special Fertilizer.....	9.00	2.47	2.00
Carolina Cotton Grower.....	9.00	2.26	2.00
Burton's Special Tobacco Fertilizer.....	9.00	2.06	3.00
C. & B.'s Best Fertilizer.....	9.00	2.00	3.00
Lowery's Special Fertilizer.....	9.00	1.65	3.00
Cracker Jack Fertilizer.....	9.00	1.65	2.00
Bone Mixture.....	9.00	1.65	1.00
Premium Cotton Grower.....	9.00	.82	3.00
Premium Wheat Grower.....	9.00	.82	2.00
Southern Trucker.....	8.00	4.11	5.00
Perfection Special.....	8.00	3.29	4.00
Carolina Bright Tobacco Fertilizer.....	8.00	2.47	3.00
Gilt Edge Fertilizer.....	8.00	2.47	3.00
Carolina Bright Special Tobacco Fertilizer....	8.00	2.26	2.50
Tip Top Fertilizer.....	8.00	2.06	3.00
Carolina Bright for Cotton.....	8.00	2.06	1.50
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25
Benson's Favorite Fertilizer.....	8.00	1.65	10.00
Benson's Special Fertilizer.....	8.00	1.65	6.00
Rex Tobacco Fertilizer.....	8.00	1.65	4.00
Premium Tobacco Fertilizer.....	8.00	1.65	2.00
Premium Brand Fertilizer.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Hunter & Dunn's Ammoniated Fertilizer.....	8.00	1.65	2.00
Parker & Hunt's Special Tobacco Fertilizer...	8.00	1.65	2.00
Parker & Hunt's Special Fertilizer.....	8.00	1.65	2.00
Edgecombe Cotton Grower.....	8.00	1.65	2.00
Premium Grain Special.....	8.00	.82	4.00
Premium Peanut Special.....	8.00	.82	4.00
Parker & Hunt's Corn Fertilizer.....	8.00	.82	3.00
Premium Peanut Grower.....	8.00	....	4.00
Tip Top Bone and Potash Mixture.....	8.00	....	4.00
Winter Grain and Grass Grower.....	8.00	....	4.00
Clark's Special Formula.....	7.00	4.94	6.00
Special High Grade for Truck.....	7.00	4.94	5.00
10 Per Cent Cabbage Guano.....	6.00	8.23	2.00
Smith's 7 Per Cent Special.....	6.00	5.76	5.00
Edwards' Prolific Cotton Grower.....	6.00	3.29	4.00
Carter's Special for Tobacco.....	4.00	2.47	6.00
Smith's Special Fertilizer.....	4.00	1.65	7.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....
Special Top Dresser.....	....	7.30	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Red Cross Guano Co., Lynchburg, Va.—

Pure Raw Bone Meal.....Total	22.00	3.71	....
Red Cross Bone Meal.....Total	22.00	3.00	....
Red Cross H. G. Phosphate.....	16.00	....	....
Red Cross Standard Phosphate.....	14.00	....	....
Red Cross Grain Grower.....	10.00	....	4.00
Red Cross Bone and Potash.....	10.00	....	2.00
Red Cross for Tobacco and Truck.....	9.00	1.85	4.00
Red Cross for Bright Tobacco.....	9.00	1.65	2.00
Red Cross Special for Tobacco.....	8.00	2.47	3.00
Red Cross Tobacco Guano.....	8.00	2.06	3.00
Red Cross Crop Grower.....	8.00	1.65	2.00

Rasin-Monumental Co., Baltimore, Md.—

Rasin 16 Per Cent Acid Phosphate.....	16.00	....	....
Rasin 14 Per Cent Acid Phosphate.....	14.00	....	....
Rasin 13 Per Cent Acid Phosphate.....	13.00	....	....
Rasin's 10-4 Bone and Potash.....	10.00	....	4.00
Rasin Bone and Potash.....	10.00	....	2.00
Rasin Special Bone and Potash.....	10.00	....	....
Rasin Dixie Guano.....	9.00	1.65	2.00
Baltimore Special Mixture.....	9.00	.82	2.00
Rasin Gold Standard.....	8.00	2.47	3.00
Rasin's Indian Brand for Tobacco.....	8.00	2.47	3.00
Rasin's General Tobacco Grower.....	8.00	2.06	3.00
Rasin Empire Guano.....	8.00	1.65	2.00
Rasin's Empire Truck Fertilizer.....	6.00	4.12	7.00

Read Phosphate Co., Charleston, S. C.—

Read's H. G. Dissolved Bone.....	16.00
Read's H. G. Acid Phosphate.....	14.00	....	....
Read's Bone and Potash.....	10.00	....	4.00
Read's Alkaline Bone.....	10.00	....	2.00
Read's Manipulated Guano.....	9.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Read's Ammoniated Dissolved Bone.....	8.00	3.30	6.00
Read's H. G. Guano.....	8.00	3.30	4.00
Read's H. G. Tobacco Leaf.....	8.00	2.47	3.00
Read's H. G. Cotton Grower.....	8.00	2.47	3.00
Read's Soluble Fish Guano.....	8.00	1.65	2.00
Read's Blood and Bone Fertilizer, No. 1.....	8.00	1.62	2.00
Read's Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	19.00	....
Muriate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

Reidsville Fertilizer Co., Reidsville, N. C.—

Reidsville Acid Phosphate.....	16.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Lion Brand Fertilizer.....	9.00	2.47	6.00
Reidsville Hustler	9.00	.82	2.00
Farmers Tobacco Fertilizer.....	8.00	3.00	3.00
Royal Fertilizer	8.00	2.47	3.00
Climax Fertilizer	8.00	2.06	3.00
Farmers Grain Guano.....	8.00	2.00	3.00
Broad Leaf Tobacco Guano.....	8.00	1.85	2.50
Banner Fertilizer	8.00	1.65	2.00
Champion Guano	8.00	1.65	2.00
Bone and Potash.....	8.00	....	4.00
Muriate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

Rowan Chemical Co., Salisbury, N. C.—

Rowan Grain Chemicals.....	20.00	....	12.00
Rowan Tobacco Chemical.....Total	16.00	4.95	6.00
Rowan Tobacco, Cotton and Application Guano.	16.00	4.93	6.00
Rowan 16 Per Cent Acid Phosphate.....	16.00	....	....
Rowan 14 Per Cent Acid Phosphate.....	14.00	....	....
Rowan 13 Per Cent Acid Phosphate.....	13.00	....	....
Rowan Success Guano.....	12.00	3.29	8.00
Rowan Bone and Potash.....	12.00	....	6.00
Rowan Bone and Potash.....	12.00	....	3.00
Rowan 12 Per Cent Acid Phosphate.....	12.00	....	....
Rowan Crop Grower.....	10.00	1.65	2.00
Rowan H. G. Bone and Potash.....	10.00	....	6.00
Rowan Bone and Potash.....	10.00	....	5.00
Rowan Grain Mixture.....	10.00	....	4.00
Rowan Bone and Potash.....	10.00	....	3.00
Rowan Bone and Potash.....	10.00	....	2.00
Rowan Special Tobacco Guano.....	9.00	2.47	3.00
Rowan Fish and Blood Guano.....	9.00	.82	3.00
Rowan Top Dresser.....	8.00	7.44	3.00
Rowan Trucker's Favorite.....	8.00	5.77	5.00
Rowan Strict Middling Guano.....	8.00	3.29	6.00
All Crop Manure.....	8.00	3.29	4.00
Rowan Double Header Guano.....	8.00	2.47	3.00
Rowan Double Header Guano for Tobacco....	8.00	2.47	3.00
Rowan Manipulated Guano.....	8.00	2.47	2.00
Rowan Fish Guano.....	8.00	2.06	3.00
Rowan Fish Guano for Tobacco.....	8.00	2.06	3.00
Rowan Heavy Weight Tobacco Guano.....	8.00	2.06	2.00
Rowan Premium Guano.....	8.00	1.65	10.00
Rowan Special for Cotton and Tobacco.....	8.00	1.65	5.00
Rowan Complete Guano.....	8.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Rowan Bone Guano.....	8.00	1.65	3.00
Rowan Double Quick Guano.....	8.00	1.65	2.00
Rowan Double Quick Guano for Tobacco.....	8.00	1.65	2.00
Rowan Wheat Mixture.....	8.00	....	4.00
Rowan Truck Guano.....	7.00	3.29	5.00
Nitrate of Soda.....	....	14.82	....
Rowan Muriate of Potash.....	....	....	50.00
Rowan Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*Swift Fertilizer Works, Atlanta, Ga., Wilmington,
N. C., and Chester, S. C.—*

Swift's Pure Raw Bone Meal.....Total	23.00	3.71
Swift's Pure Bone Meal.....Total	23.00	2.47	....
Swift's Pure Bone Meal, H. G.....Total	23.00	2.47	....
Swift's Special High Grade Acid Phosphate..	16.00	....	....
Swift's Cultivator High Grade Acid Phosphate.	14.00	....	....
Swift's Harrow Standard Grade Acid Phos- phate	13.00	....	....
Swift's Special High Grade Phosphate and Potash	12.00	....	6.00
Swift's Atlanta High Grade Phosphate and Potash	12.00	....	4.00
Swift's Chattahoochee Standard Grade Acid Phosphate	12.00	....	....
Swift's Farmers' Special H. G. G.....	10.00	3.29	4.00
Swift's Corn and Cotton Grower H. G. Guano.	10.00	2.47	3.00
Swift's Eagle High Grade Guano.....	10.00	1.65	2.00
Swift's Planters' Special Standard Grade Guano	10.00	.82	3.00
Swift's Plow Boy Guano.....	10.00	.82	1.00
Swift's Atlanta H. G. Phosphate and Potash..	10.00	....	5.00
Swift's Farmer's Home High Grade Phosphate and Potash	10.00	....	4.00
Swift's Field and Farm Standard Grade Phos- phate and Potash.....	10.00	....	2.00
Swift's Wheat Grower Standard Grade Phos- phate and Potash.....	10.00	....	2.00
Swift's Special High Grade Guano.....	9.50	4.12	3.00
Swift's Blood, Bone and Potash High Grade Guano	9.50	3.29	7.00
Swift's Cotton King High Grade Guano.....	9.00	2.47	2.00
Swift's Special Cotton Guano.....	9.00	2.26	2.00
Swift's Gold Medal C. S. M. Compound H. G. Guano	9.00	1.65	3.00
Swift's Farmers' Favorite High Grade Guano.	9.00	1.65	3.00
Swift's Cotton Plant Standard Grade Guano..	9.00	1.65	1.00
Swift's Cape Fear Truck Guano, H. G.....	8.00	4.12	2.00
Swift's Monarch H. G. Guano Vegetable Grower	8.00	3.29	4.00
Swift's Monarch C. S. M. Comp. H. G. G....	8.00	3.29	4.00
Swift's Strawberry Grower H. G. Guano.....	8.00	2.47	10.00
Swift's Carolina Tobacco Grower H. G. Guano.	8.00	2.47	3.00
Swift's Ruralist High Grade Guano.....	8.00	2.47	3.00
Swift's Plow Boy C. S. M. Compound H. G. Guano	8.00	2.47	3.00
Swift's Special Blood Guano for Cotton or To- bacco, H. G.....	8.00	2.06	3.00
Braswell's Formula Standard Grade Guano...	8.00	2.06	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Swift's Pioneer High Grade Guano Tobacco Grower	8.00	1.65	4.00
Clark's Special Cotton Grower, G. G.	8.00	1.65	3.00
Swift's Red Steer Standard Grade Guano....	8.00	1.65	2.00
Swift's Golden Harvest Standard Grade Guano	8.00	1.65	2.00
Swift's Special Peanut Grower Standard Grade Guano	8.00	.82	4.00
Swift's Plantation Standard Grade Phosphate and Potash	8.00	....	4.00
Swift's Carolina 7 Per Cent Special Trucker H. G. Guano.	7.00	5.76	7.00
Swift's Special Irish Potato Grower H. G. Guano	7.00	4.12	8.00
Swift's Early Trucker H. G. Guano.	7.00	4.12	5.00
High Grade Swift's No. 1 Ground Tankage...	6.00	8.24	....
Swift's Special Trucker H. G. Guano.	6.00	5.76	5.00
Swift's Favorite Truck Guano H. G.	6.00	4.94	6.00
Swift's Special Potato Grower H. G. Guano...	6.00	4.12	7.00
Swift's Special Tobacco Grower H. G. Guano.	6.00	3.29	6.00
Swift's Special 10 Per Cent Blood and Bone Trucker H. G. Guano.	5.00	8.23	3.00
Swift's Excelsior Top Dresser H. G. Guano...	4.00	6.18	2.00
Swift's Pure Nitrate of Soda .....	....	14.82	....
Swift's Ground Dried Blood .....	....	13.18	....
Swift's Muriate of Potash .....	....	....	50.00
Swift's Sulphate of Potash .....	....	....	49.00
Swift's Pure German Kainit .....	....	....	12.00

Southern Chemical Co., Inc., Roanoke, Va.—

Pride of Virginia	8.00	2.47	3.00
Valley Queen	8.00	1.65	10.00
Farmers' Joy	8.00	1.65	4.00
Our Favorite	8.00	1.65	2.00

Spartanburg Fertilizer Co., Spartanburg, S. C.—

Tiger Brand Acidulated Phosphate	14.00	....	....
West's Potash Acid	13.00	....	3.00
Gosnell's Plant Food	10.50	2.46	2.00
N. C. Special	10.50	1.65	8.00
Corn Formula	10.50	1.65	5.00
Dana's Best	10.00	....	4.00
Melrose	10.00	....	2.00
Boll Buster	9.00	1.65	2.00
Glencoe	8.00	2.46	3.00
Cotton Compound	8.75	1.65	2.00
Potato Guano	7.00	2.46	7.00
Nitrate of Soda .....	....	14.81	....
Muriate of Potash .....	....	....	48.00

Scotland Neck Guano Co., Scotland Neck, N. C.—

Our 16 Per Cent Acid Phosphate	16.00	....	....
Our 14 Per Cent Acid Phosphate	14.00	....	....
Our Bone and Potash Mixture	10.00	....	4.00
Noah Biggs' Truck Guano	9.00	4.10	5.00
Biggs' Cotton-seed Meal Fish Scrap Guano...	9.00	3.30	4.00
Josey's Cotton-seed Meal and Fish Scrap To- bacco Guano	9.00	2.47	3.00
Old Halifax Cotton-seed Meal and Fish Scrap Tobacco Guano	9.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Our Cotton Growers C. S. M. and Fish Scrap Guano	9.00	2.05	2.50
Our Favorite Cotton-seed Meal Guano.....	9.00	1.65	2.00
Our Bright Tobacco Guano.....	8.00	2.47	3.00
Our Best Peanut Guano.....	5.50	1.23	5.50
K. Elite Top Dressing.....	3.00	7.40	3.50
Nitrate of Soda.....	....	15.50	....
Sulphate of Potash.....	....	....	48.00
Muriate of Potash.....	....	....	48.00
Our Genuine German Kainit.....	....	....	12.00

The Southern Exchange Co., Macon, N. C.—

S. E. C. Acid Phosphate.....	16.00	....	....
S. E. C. Acid Phosphate.....	14.00	....	....
S. E. C. Potash Mixture.....	10.00	....	4.00
S. E. C. Bone and Potash Mixture.....	10.00	....	2.00
Juicy Fruit Fertilizer.....	9.00	1.85	4.00
The Walnut Fertilizer.....	8.50	2.06	2.50
Melon Grower	8.00	4.11	7.00
McKimmion's Special Truck Formula.....	8.00	4.11	7.00
Two Fours Guano.....	8.00	3.29	4.00
Southern Exchange Co.'s Bright Tobacco Formula	8.00	2.47	4.00
That Big Stick Guano.....	8.00	2.47	4.00
Bull of the Woods Fertilizer.....	8.00	2.47	4.00
Jack's Best Fertilizer.....	8.00	2.47	3.00
Correct Cotton Compound.....	8.00	2.47	3.00
R. M. C. Special Crop Grower.....	8.00	2.47	3.00
Southern Exchange Co.'s Special Tobacco Fertilizer	8.00	1.65	3.00
Currie Crop Lifter.....	8.00	1.65	3.00
The Racer Guano.....	8.00	1.65	3.00
The Coon Guano.....	8.00	1.65	2.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	12.00

Southern Cotton Oil Co., Charleston, S. C.—

Pioneer	7.00	3.62	5.00
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Smith, Ham & Co., Pikeville, N. C.—

Genuine German Kainit.....	12.00
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H. T. Shannonhouse, Hertford, N. C.—

H. T. Shannonhouse 16 Per Cent Acid Phosphate	16.00
H. T. Shannonhouse 14 Per Cent Acid Phosphate	14.00	....	....
Shannonhouse Bone and Potash.....	10.00	....	4.00
H. T. S. Full Value.....	8.00	3.29	4.00
Pride of Carolina.....	8.00	3.29	4.00
H. T. S. Favorite.....	8.00	3.29	4.00
Farmers' Tobacco Favorite.....	8.00	2.47	3.00
Nun Better	8.00	2.47	3.00
Shannonhouse Blood and Bone.....	8.00	2.47	3.00
Southern Pride	8.00	2.47	3.00
Carolina's Choice	8.00	2.47	3.00
Sunny South	8.00	2.47	3.00
H. T. S. Tobacco Grower.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
• Shannonhouse Success	8.00	1.65	2.00
Square Deal	8.00	1.65	2.00
X. L. M. for Cotton and Corn.....	8.00	1.65	2.00
Farmers' Money Maker.....	8.00	1.65	2.00
P. D. Q. Truck Grower.....	6.00	4.11	5.00
Shannonhouse High Grade.....	6.00	4.11	5.00
Genuine German Kainit.....	....	....	12.00

*The Southern Cotton Oil Co., Charlotte District,
Concord, Charlotte, Davidson, Shelby, Gib-
son, Monroe and Wadesboro—*

• Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	16.00	....	....
Gold Seal	14.00	....	....
Silver King	13.00	....	....
Conqueror Bone and Potash.....	10.00	....	4.00
Magnolia Bone and Potash.....	10.00	....	2.00
Uncle Sam	9.00	2.47	3.00
Home Made	9.00	2.05	3.00
Razem	9.00	1.65	3.00
King Bee	8.83	1.65	2.00
Choice	8.00	3.30	6.00
Conqueror	8.00	3.30	4.00
Canto	8.00	3.29	6.00
Melonite	8.00	3.29	4.00
Peacock	8.00	2.47	3.00
Moon	8.00	2.47	3.00
Landsake	8.00	2.47	2.50
Red Bull	8.00	2.06	2.00
All-to-Good	8.00	2.05	3.00
Gloria	8.00	1.65	2.00
Double Two	8.00	1.65	2.00
Dandy Top Dresser.....	4.00	9.07	2.50
Nitrate of Soda.....	....	15.00	....
Nitrate of Soda.....	....	13.20	....
Labi .....	....	8.99	17.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*Southern Cotton Oil Co., Goldsboro, Fayetteville,
Rocky Mount and Wilson—*

Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	16.00	....	....
Southern Cotton Oil Co.'s 14 Per Cent Acid Phosphate	14.00	....	....
Best & Thompson's Special Cotton Grower....	9.00	2.27	2.00
Goldsboro Cotton Grower.....	9.00	2.27	2.00
Goldsboro Oil Mill Special Mixture.....	8.00	3.30	4.00
Fayetteville Oil Mill Special Mixture.....	8.00	3.30	4.00
Wilson Oil Mill Special Mixture.....	8.00	3.30	4.00
Rocky Mount Oil Mill Special Mixture.....	8.00	3.30	4.00
Southern Cotton Oil Co.'s Special Mixture....	8.00	3.30	4.00
Southern Cotton Oil Co.'s Melon Grower.....	8.00	2.47	10.00
Southern Cotton Oil Co.'s Special Cotton Grower	8.00	2.47	3.00
Best & Thompson's High Grade.....	8.00	2.47	3.00
Goldsboro Oil Mill Special Cotton Grower....	8.00	2.47	3.00
Fayetteville Oil Mill Special Cotton Grower..	8.00	2.47	3.00
Wilson Oil Mill Special Cotton Grower.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Rocky Mount Oil Mill Special Cotton Grower.	8.00	2.47	3.00
B. G. Thompson's Special Cotton and Tobacco Guano	8.00	2.47	3.00
Edgerton's Old Reliable.....	8.00	2.47	3.00
Morning Glory	8.00	2.47	3.00
Goldsboro Oil Mill High Grade.....	8.00	2.27	2.50
Fayetteville Oil Mill High Grade.....	8.00	2.27	2.50
Wilson Oil Mill High Grade.....	8.00	2.27	2.50
The Southern Cotton Oil Co. High Grade.....	8.00	2.27	2.50
Southern Cotton Oil Co.'s Peanut Grower....	8.00	1.65	4.00
Goldsboro Oil Mill Standard.....	8.00	1.65	2.00
Fayetteville Oil Mill Standard.....	8.00	1.65	2.00
Wilson Oil Mill Standard.....	8.00	1.65	2.00
Rocky Mount Oil Mill Standard.....	8.00	1.65	2.00
The Southern Cotton Oil Co. Standard.....	8.00	1.65	2.00
Southern Cotton Oil Co. Truck Grower.....	6.00	4.12	7.00

Southern Cotton Oil Co., Goldsboro, N. C.—

Rocky Mount Top Dresser.....	....	7.43	4.00
S. C. O. Co. Top Dresser.....	4.00	8.25	4.00

Tidewater Guano Co., Norfolk, Va.—

Tidewater Raw Bone Meal.....Total	21.00	3.71	....
Top Rail Acid Phosphate.....	16.00	....	....
J. W. S. Acid Phosphate.....	13.00	....	....
Buster Brown Acid Phosphate.....	14.00	....	....
Tidewater Bone and Potash.....	10.00	....	5.00
Diana Brand Bone and Potash Compound....	10.00	....	4.00
Bully Boy Dissolved Bone and Potash.....	10.00	....	2.00
Diana Brand Soluble Guano.....	8.00	3.30	6.00
High Grade Soluble Guano for Tobacco.....	8.00	3.30	4.00
High Tide Soluble Guano.....	8.00	3.30	4.00
Sho Nuf Guano, H. G.....	8.00	2.47	3.00
Sho Nuf Guano High Grade Complete Manure for Tobacco	8.00	2.47	3.00
Hawk Eye Soluble Guano.....	8.00	2.07	2.00
"Hawk Eye" Soluble Guano for Tobacco.....	8.00	2.07	2.00
Soil King Special Guano.....	8.00	1.85	4.00
"Soil King" Special Guano for Tobacco.....	8.00	1.85	4.00
Double Action Soluble Guano.....	8.00	1.65	2.00
Double Action Soluble Guano for Tobacco....	8.00	1.65	2.00
"Good Money" Complete Guano.....	8.00	1.00	4.00
Tidewater 4-6-4 Guano.....	6.00	3.30	4.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Fish .....	....	9.04	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

The Trotman Mfg. Co., Churchland, Va.—

Trotman's Special Mixture.....	8.00	2.46	3.00
Trotman's 2-8-2 Fertilizer.....	8.00	1.64	2.00

Tuscarora Fertilizer Co., Atlanta, Ga., and Wilmington, N. C.—

Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Tuscarora Alkaline Bone.....	10.00	....	5.00
Tuscarora Acid and Potash.....	10.00	....	4.00
Tuscarora Bone and Potash.....	10.00	....	2.00
Tuscarora Chief	9.00	1.65	3.00
Tuscarora Trucker	8.00	4.11	7.00
Fertilizer, No. 844.....	8.00	3.30	4.00
Boon's Special	8.00	2.47	4.00
Tobacco Special	8.00	2.47	3.00
Cotton Special	8.00	2.47	3.00
Berry King	8.00	2.05	4.00
King Cotton	8.00	2.05	2.00
Tuscarora Champion	8.00	2.05	2.50
Tuscarora Champion Tobacco Grower.....	8.00	2.05	2.50
Tuscarora Fruit and Potato.....	8.00	1.65	10.00
Tuscarora Fertilizer, No. 8-2-5.....	8.00	1.65	5.00
Tuscarora Standard	8.00	1.65	2.00
Tuscarora Standard Tobacco Grower.....	8.00	1.65	2.00
Tuscarora Bone and Potash.....	8.00	....	4.00
Big Four (4) Fertilizer.....	7.00	1.65	4.00
Manure Substitute	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Union Guano Co., Winston-Salem, N. C.—

Pure Raw Animal Bone Meal.....Total	22.50	3.71	....
Pure Animal Bone Meal.....Total	22.50	2.47	....
Union 16 Per Cent Acid Phosphate.....	16.00	....	....
Union High Grade Acid Phosphate.....	14.00	....	....
Union Dissolved Animal Bone.....Total	13.00	2.06	....
Union Dissolved Bone.....	13.00	....	....
Union 12-6 Bone and Potash.....	12.00	....	6.00
Union 12-5 Bone and Potash.....	12.00	....	5.00
Union 12-4 Bone and Potash.....	12.00	....	4.00
Union 12-3 Bone and Potash.....	12.00	....	3.00
Union 12-2 Bone and Potash.....	12.00	....	2.00
Union 12 Per Cent Acid Phosphate.....	12.00	....	....
Liberty Bell Crop Grower.....	10.50	....	1.50
Union Prolific Cotton Compound.....	10.00	3.29	4.00
Union Special Formula for Cotton.....	10.00	2.47	3.00
Union Mule Brand Guano.....	10.00	1.65	2.00
Union 10-6 Bone and Potash.....	10.00	....	6.00
Union 10-5 Bone and Potash.....	10.00	....	5.00
Union 10-4 Bone and Potash.....	10.00	....	4.00
Quakers' Grain Mixture.....	10.00	....	4.00
Giant Phosphate and Potash.....	10.00	....	3.00
Finch & Harris's Special Bone and Potash Mixture	10.00	....	3.00
Union Bone and Potash.....	10.00	....	2.00
Union Renown Guano	9.00	2.47	3.00
Union Perfect Cotton Grower.....	9.00	2.26	2.00
Union Complete Cotton Mixture.....	9.00	1.65	3.00
Farmers' Blood and Bone Guano.....	9.00	1.65	3.00
Dixie Cotton Grower.....	9.00	1.65	2.00
Q. and Q. (Quality and Quantity) Guano....	9.00	1.65	1.00
"B. S." Ammoniated Guano.....	9.00	.82	3.00
Union Approved Crop Grower.....	8.75	1.65	2.00
Union Guano for Cotton and Tobacco.....	8.00	3.29	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Union Premium Guano.....	8.00	3.29	4.00
Union Homestead Guano.....	8.00	2.47	3.00
Victoria High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Union Water Fowl Guano.....	8.00	2.66	3.00
Union Standard Tobacco Grower.....	8.00	2.06	2.00
Union Potato Mixture.....	8.00	1.65	10.00
Christian's Special Tobacco Grower.....	8.00	1.65	3.00
Old Honesty Guano.....	8.00	1.65	2.00
Old Honesty Tobacco Guano.....	8.00	1.65	2.00
Fish Brand Ammoniated Guano.....	8.00	1.65	2.00
Union Superlative Guano.....	8.00	.82	4.00
Sunrise Ammoniated Guano.....	8.00	.82	3.00
Union S-5 Bone and Potash.....	8.00	....	5.00
Union Wheat Mixture.....	8.00	....	4.00
Union Vegetable Compound.....	7.00	4.12	8.00
Union Truck Guano.....	7.00	3.29	5.00
Nitrate of Soda.....	....	14.83	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

United States Fertilizer Co., Baltimore, Md.—

Farm Bell Acid Phosphate.....	16.00	....	....
Farm Bell Acid Phosphate.....	14.00	....	....
Farm Bell Phospho. Potassa.....	12.00	....	5.00
Farm Bell Potash and Acid.....	10.00	....	6.00
Farm Bell Special Mixture.....	10.00	....	4.00
Farm Bell Alkaline Mixture.....	10.00	....	2.00
Farm Bell Big Yield.....	9.00	2.47	4.00
Farm Bell Buckeye Guano.....	9.00	.82	2.00
Farm Bell Majestic Guano.....	8.00	3.28	4.00
Farm Bell Cotton Special.....	8.00	2.47	3.00
Farm Bell Tobacco Special.....	8.00	2.47	3.00
Farm Bell Crop Grower.....	8.00	2.06	3.00
Farm Bell Fruit and Potato.....	8.00	1.65	10.00
Farm Bell Animal Ammoniated.....	8.00	1.65	5.00
Farm Bell Standard Guano.....	8.00	1.65	2.00
Farm Bell Pennant Winner.....	8.00	.82	4.00
Farm Bell Phosphate and Potash.....	8.00	....	5.00
Farm Bell Trucker's Ideal.....	7.00	4.11	8.00
Farm Bell Potato and Tobacco Guano.....	7.00	2.47	10.00
Farm Bell 7 Per Cent Trucker.....	6.00	5.75	5.00
Farm Bell Trucker's Favorite.....	6.00	3.28	8.00

Union Abattoir Co., Baltimore, Md., and Richmond, Va.—

Pure Bone and Potash Compound.....	16.00	1.65	2.50
Red Star Acid Phosphate.....	16.00	....	....
Red Star Acid Phosphate.....	14.00	....	....
Pure Dissolved Animal Bone.....	12.00	1.65	....
Red Star Potash and Soluble Bone.....	12.00	....	5.00
Potash and Soluble Bone (Red Star).....	12.00	....	3.00
Red Star Potash and Soluble Bone.....	10.00	....	5.00
Red Star Potash and Soluble Bone.....	10.00	....	2.00
Red Star Brand Tobacco Compound.....	9.00	3.27	2.00
Red Star Brand Cotton Guano.....	8.00	3.28	4.00
Red Star Early Truck and Tobacco Guano...	8.00	3.28	4.00
Red Star Cotton and Tobacco Guano.....	8.00	2.46	3.00
Red Star Tobacco Fertilizer.....	8.00	2.05	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Red Star Cotton Guano.....	8.00	1.65	2.00
Red Star Standard.....	8.00	1.65	2.00
Red Star Grain and Grass.....	8.00	1.00	4.00
Red Star Peanut Grower.....	8.00	1.00	4.00
Red Star Potato Manure.....	7.00	2.46	10.00
Red Star Special Guano.....	7.00	2.46	5.00
Red Star 7 Per Cent Guano.....	6.00	5.74	5.00
Early Truck and Potato Guano.....	6.00	4.10	7.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

R. L. Upshur, Norfolk, Va.—

Upshur's 16 Per Cent Acid Phosphate.....	16.00	....	....
Upshur's High Grade Acid Phosphate.....	14.00	....	....
Upshur's Wheat Compound.....	12.00	....	5.00
Upshur's Bone and Potash Guano.....	10.00	....	2.00
Cotton-seed Meal Mixture.....	9.00	2.26	2.00
Upshur's O. P. (Old Plantation).....	9.00	1.65	2.00
Upshur's Special	8.00	3.30	4.00
Upshur's 8-3-3 Cotton.....	8.00	2.47	3.00
Upshur's High Grade Tobacco Guano.....	8.00	2.47	3.00
Upshur's Special 2½-8-3.....	8.00	2.05	3.00
Upshur's F. F. V. (Favorite Fertilizer of Virginia)	8.00	1.65	2.00
Upshur's Peanut Guano.....	8.00	1.65	2.00
Upshur's G., G. & C. Guano.....	8.00	1.65	2.00
Premo Cotton Guano.....	8.00	1.65	2.00
Upshur's Fish, Bone and Potash.....	8.00	1.64	4.00
Upshur's Special Truck Guano.....	7.00	4.11	8.00
Upshur's F. F. (Farmers' Favorite).....	7.00	4.11	6.00
Upshur's New Process Guano.....	6.00	6.58	8.00
Upshur's F. C. (Farmers' Challenge).....	6.00	5.76	6.00
Upshur's 7 Per Cent Irish Potato Guano.....	6.00	5.76	5.00
Upshur's 4-6-4 Tobacco Special.....	6.00	3.69	4.00
Upshur's Norfolk Special 10 Per Cent.....	5.00	8.23	2.00
Upshur's Special Potato Guano.....	5.00	5.76	5.00
Upshur's 5 Per Cent.....	5.00	4.11	5.00
Nitrate of Soda.....	....	15.22	....
Ground Fish .....	....	9.04	....
Ground Tankage .....	....	6.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Venable Fertilizer Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone.....Total	22.50	3.70	....
Venable's Best Acid Phosphate.....	16.00	....	....
H. G. Acid Phosphate.....	14.00	....	....
Venable's Dissolved Bone.....	13.00	....	....
Venable's Standard Acid Phosphate.....	12.00	....	....
Venable's Corn, Wheat and Grass Fertilizer..	10.00	.82	1.00
High Grade Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Venable's Carolina Favorite.....	9.00	2.47	6.00
Roanoke Mixture	9.00	2.26	2.00
Roanoke Meal Mixture.....	9.00	2.26	2.00
Venable's B. B. P. Manure.....	9.00	1.65	1.00
Venable's 5 Per Cent Trucker.....	8.00	4.11	5.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Venable's 4 Per Cent Trucker.....	8.00	3.29	4.00
Venable's H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Ballard's Choice Fertilizer.....	8.00	2.47	3.00
Venable's Alliance Tobacco Manure, No. 1....	8.00	2.06	3.00
Venable's Cotton Grower.....	8.00	2.06	3.00
Venable's Roanoke Special.....	8.00	2.06	3.00
Venable's Ideal Manure.....	8.00	1.65	5.00
Our Union Tobacco Fertilizer.....	8.00	1.65	4.00
Venable's Meal Mixture.....	8.00	1.65	2.00
Venable's Alliance Tobacco Manure, No. 2....	8.00	1.65	2.00
Venable's Meal Mixture.....	8.00	1.65	2.00
Our Union Special Fertilizer.....	8.00	1.65	2.00
Planters' Bone Fertilizer.....	8.00	1.65	2.00
Venable's Peanut Special.....	8.00	.82	4.00
Venable's Alliance Bone and Potash Mixture.	8.00	....	4.00
Venable's Peanut Grower.....	8.00	....	4.00
Venable's 10 Per Cent Trucker.....	6.00	8.23	2.00
Venable's 6-6-6 Manure.....	6.00	4.94	6.00
Nitrate of Soda.....	....	15.63	....
Special Top Dresser.....	....	7.30	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Vance Guano Co., Henderson, N. C.—

Vance Corn and Grain Grower.....	10.00	1.00	3.50
"Farmers' Union" Highest Grade Fertilizer..	9.00	3.00	3.00
Brodie's Best	8.00	4.00	4.00
Fish Brand Guano for Tobacco.....	8.00	3.00	3.00
Sterling Cotton Grower.....	8.00	2.00	2.00
Hot-Stuff for Cotton.....	8.00	2.00	2.00
Vance Top Dresser.....	3.00	10.00	5.00

Virginia-Carolina Chemical Co., Richmond, Va.—

V.-C. C. Co.'s 17 Per Cent Acid Phosphate....	17.00	....	....
V.-C. C. Co.'s 16 Per Cent Acid Phosphate....	16.00	....	....
V.-C. C. Co.'s 14 Per Cent Acid Phosphate....	14.00	....	....
V.-C. C. Co.'s Special High Grade Potash Mix- ture	12.00	....	6.00
V.-C. C. Co.'s H. G. Potash Mixture.....	12.00	....	5.00
V.-C. C. Co.'s 12-4 Grain Grower.....	12.00	....	4.00
V.-C. C. Co.'s Special Crop Grower.....	12.00	....	3.00
V.-C. C. Co.'s Grain Special.....	10.00	....	6.00
V.-C. C. Co.'s Standard Bone and Potash....	10.00	....	5.00
V.-C. C. Co.'s Special Potash Mixture.....	10.00	....	4.00
V.-C. C. Co.'s Dissolved Bone and Potash....	10.00	....	2.00
V.-C. C. Co.'s Cotton Grower.....	9.00	2.26	2.00
V.-C. C. Co.'s Farmers' Choice.....	8.00	3.29	4.00
V.-C. C. Co.'s Special.....	8.00	3.29	4.00
V.-C. C. Co.'s High Grade Tobacco Fertilizer..	8.00	2.47	10.00
V.-C. C. Co.'s Monarch Brand.....	8.00	1.65	5.00
V.-C. C. Co.'s Corn and Peanut Special.....	8.00	1.65	2.00
V.-C. C. Co.'s Special Peanut Grower.....	8.00	1.00	4.00
V.-C. C. Co.'s Peanut Grower.....	8.00	.82	4.00
V.-C. C. Co.'s Potash Mixture for Peanuts....	8.00	....	4.00
V.-C. C. Co.'s Truck Crop Fertilizer.....	7.00	4.12	7.00
V.-C. C. Co.'s Potash Potato Producer.....	7.00	3.29	8.00
V.-C. C. Co.'s Formula 44 for Bright Wrappers and Smokers	7.00	2.55	3.30

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
V.-C. C. Co.'s Plant Bed and High Grade.....	7.00	2.26	6.00
V.-C. C. Co.'s Special Truck Guano.....	6.00	4.12	7.00
V.-C. C. Co.'s High Grade Top Dresser.....	4.00	6.17	2.50
V.-C. C. Co.'s 10 Per Cent Top Dresser Extra H. G.	4.00	8.24	4.00
Johnston's Best	20.00	4.94	6.00
Sludge Acid Phosphate.....	14.00	....	....
Goodman's Special Potash Mixture.....	12.00	....	5.00
Battle's Crop Grower.....	12.00	....	3.00
Home Comfort Acid Phosphate.....	12.00	....	....
Virginia 11-5 Bone and Potash.....	11.00	....	5.00
Ideal Crop Grower.....	10.00	2.46	3.00
Sovereign Crop Producer.....	10.00	1.65	2.00
Ford's Wheat and Corn Guano.....	10.00	.82	2.50
Great Texas Cotton Grower Soluble Guano...	9.00	2.47	4.00
Jeffrey's High Grade Guano.....	9.00	2.47	3.00
Southern Cotton Grower.....	9.00	2.29	2.00
Best's Special Cotton Grower.....	9.00	2.26	2.00
Powell's Special H. G. C. S. M.....	9.00	2.26	3.00
Prolific Cotton Grower.....	9.00	2.26	2.00
White Stem C. S. M.....	9.00	2.26	2.00
Standard Cotton Grower C. S. M.....	9.00	2.26	2.00
Bumper Crop Guano.....	9.00	2.06	5.00
Cuban Special Mixture.....	9.00	1.85	4.00
Cock's Soluble Guano High Grade Animal Bone	9.00	1.85	3.00
No. 923 Guano.....	9.00	1.65	3.00
Reliable Cotton Brand Fertilizer.....	9.00	1.65	3.00
North State Guano C. S. M.....	9.00	1.65	1.00
Bigelow's Crop Guano.....	9.00	.82	3.00
Burnhardt's Grain and Crop Guano.....	9.00	.82	3.00
McCormick's Wheat and Grain Guano.....	9.00	.82	3.00
Farmers' Friend Favorite Fertilizer Special..	8.50	1.65	2.00
Farmers' Success	8.00	2.47	4.00
Powhatan Crop Mixture.....	8.50	1.65	1.50
Pelican Peruvian Guano (1,000 pounds Genu- ine Peruvian Guano to the ton).....	8.00	4.12	5.00
Muse's Special	8.00	3.70	7.00
Croom's Crop Grower.....	8.00	3.29	4.00
Fish and Meal Mixture.....	8.00	3.29	4.00
Carr's 8-4-4 Crop Grower.....	8.00	3.29	4.00
Lion's High Grade Tobacco Fertilizer.....	8.00	2.47	4.00
Croom's Special Cotton Fertilizer.....	8.00	2.47	3.00
Menhaden Fish and Meal Mixture.....	8.00	2.47	3.00
Best's H. G. Cotton and Tobacco Grower.....	8.00	2.47	3.00
Jumbo Peruvian Guano (1,000 pounds Gennine Peruvian Guano to the ton).....	8.00	2.47	3.00
Oldham's Special Compound for Tobacco, High Grade	8.00	2.47	3.00
Blake's Best	8.00	2.47	3.00
Royal High Grade Fertilizer.....	8.00	2.47	3.00
Special High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Adams' Special	8.00	2.47	3.00
Peruvian H. G. Tobacco Guano.....	8.00	2.47	3.00
Red Chief H. G. Cotton Grower.....	8.00	2.47	3.00
Zeno Special Compound for Tobacco, H. G....	8.00	2.47	3.00
Gold Medal H. G. Tobacco Guano.....	8.00	2.47	3.00
Atlas Guano C. S. M.....	8.00	2.47	2.50
John F. Croom & Bro. Fish and Meal Mixture.	8.00	3.29	4.00
Pace's 5 Per Cent Special Potato Guano.....	8.00	1.65	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
The Harvester	8.00	.82	3.00
Pinnacle Grain Grower.....	8.00	.82	3.00
Pure Animal Bone Meal.....Total	23.00	2.47	....
Pure Raw Bone Meal.....Total	21.50	3.71	....
Dissolved Animal Bone.....	13.00	2.06	....
Admiral	8.00	2.47	2.50
Good Luck C. S. M.....	8.00	2.47	2.50
Split Silk C. S. M.....	8.00	2.47	2.50
Myatt's Special High Grade Fertilizer.....	8.00	2.47	3.00
Orange Grove Guano.....	8.00	2.26	2.50
Delta C. S. M.....	8.00	2.26	2.50
Royal Crown	8.00	2.26	2.00
Blue Star C. S. M.....	8.00	2.06	3.00
Superlative C. S. M. Guano.....	8.00	2.06	3.00
Smith's Irish Potato Guano.....	8.00	1.65	10.00
Parker & Hunter's Special.....	8.00	1.65	4.00
Winston Special for Cotton C. S. M.....	8.00	1.65	2.00
Diamond Dust C. S. M.....	8.00	1.65	2.00
Plant Food C. S. M.....	8.00	1.65	2.00
Wilson's Standard C. S. M.....	8.00	1.65	2.00
Ajax C. S. M. Guano.....	8.00	1.65	2.00
Farmers' Favorite Fertilizer C. S. M.....	8.00	1.65	2.00
Jones' Grain Special.....	8.00	....	4.00
Konqueror H. G. Truck Fertilizer.....	7.00	4.12	5.00
Pasquotank Trucker	7.00	3.29	8.00
Invincible High Grade Fertilizer.....	6.00	4.12	7.00
Kitty Hawk Truck Fertilizer.....	6.00	4.12	7.00
Dewberry's Special	4.00	6.59	....
Sulphate of Ammonia .....	....	20.59	....
Sulphate of Potash.....	....	....	48.00
Nitrate of Soda.....	....	14.82	....
Fish Scrap .....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Manure Salts .....	....	....	12.00
Genuine German Kainit.....	....	....	12.00
Allison & Addison's Fulton Acid Phosphate...	14.00	....	....
Allison & Addison's I. X. L. Acid Phosphate..	13.00	....	....
Allison & Addison's Standard Acid Phosphate.	12.00	....	....
Allison & Addison's Rocket Acid Phosphate...	12.00	....	....
Allison & Addison's B. P. Potash Mixture....	10.00	....	2.00
Allison & Addison's McGavock's Special Potash Mixture	10.00	....	2.00
Allison & Addison's Star Special Tobacco Manure	9.00	2.26	2.00
Allison & Addison's Star Brand Special H. G.	9.00	2.06	5.00
Allison & Addison's Star Brand Guano.....	9.00	1.65	1.00
Allison & Addison's Little Giant Grain and Grass Grower	9.00	.82	2.00
Allison & Addison's Anchor Brand Tobacco Fertilizer	8.50	2.26	2.00
Allison & Addison's Star Vegetable Brand Guano	8.00	3.70	4.00
Allison & Addison's A. A. Guano.....	8.00	2.47	3.00
Allison & Addison's Anchor Brand Fertilizer..	8.00	1.65	2.00
Allison & Addison's Old Hickory Guano.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Acid Phosphate	16.00	....	....
Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Phosphate	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Atlantic and Virginia Fertilizer Co.'s Crenshaw Acid Phosphate.....	13.00	....	....
Atlantic and Virginia Fertilizer Co.'s Our Acid Phosphate	12.00	....	....
Nowell's Special	8.00	3.29	4.00
N. and R.'s Best.....	9.00	2.47	3.00
V.-C. C. Co.'s Vececo Cotton Grower.....	9.00	2.26	2.00
3 Per Cent Special C. S. M. Guano, No. 3.....	8.00	2.47	2.00
Diamond C. S. M. Guano.....	8.00	2.47	3.00
Atlantic and Virginia Fertilizer Co.'s Eureka Bone and Potash Compound.....	10.00	....	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9.00	2.06	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Complete Manure	9.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Virginia Truckers	8.00	4.12	5.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Special for Tobacco.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Carolina Truckers	7.00	5.76	7.00
Charlotte Oil and Fertilizer Co.'s 15 Per Cent Acid Phosphate	15.00	....	....
Charlotte Oil and Fertilizer Co.'s Catawba Bone Phosphate	14.00	....	....
Charlotte Oil and Fertilizer Co.'s Charlotte Acid Phosphate	13.00	....	....
Charlotte Oil and Fertilizer Co.'s Dayvault's Special	12.00	....	6.00
Charlotte Oil and Fertilizer Co.'s Charlotte Dissolved Bone	12.00	....	....
Charlotte Oil and Fertilizer Co.'s Oliver's Perfect Wheat Grower.....	11.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s 10-2 Bone and Potash	10.00	....	2.00
Charlotte Oil and Fertilizer Co.'s High Grade Special Tobacco Fertilizer.....	9.00	2.06	2.00
Charlotte Oil and Fertilizer Co.'s Queen of the Harvest C. S. M.....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s McCrary's Diamond Bone and Potash.....	9.00	....	3.00
Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fertilizer.....	8.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s Catawba Guano B. G.....	8.00	2.47	3.00
Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano C. S. M.....	8.00	2.47	2.00
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano B. G.....	8.00	2.06	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano C. S. M.....	8.00	2.06	1.50
The Leader B. G.....	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s King Cotton Grower	8.00	1.65	2.00
Davie & Whittle's Owl Brand High Grade Acid Phosphate	16.00	....	....
Davie & Whittle's Owl Brand High Grade Dissolved Bone	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Davie & Whittle's Owl Brand Acid Phosphate.	13.00	....	....
Davie & Whittle's Owl Brand Dissolved Bone.	12.00	....	....
Davie & Whittle's Owl Brand Acid Phosphate with Potash	10.00	....	2.00
Davie & Whittle's Owl Brand High Grade 3 Per Cent Soluble Guano.....	9.00	2.06	3.00
Davie & Whittle's Owl Brand Special Tobacco Guano	9.00	2.06	2.00
Davie & Whittle's Owl Brand Truck Guano..	8.00	4.94	5.00
Davie & Whittle's Owl Brand Guano for To- bacco	8.00	2.47	3.00
Davie & Whittle's Vinco Guano.....	8.00	1.65	3.00
Davie & Whittle's Owl Brand Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Durham Best Acid Phosphate	16.00	....	....
Durham Fertilizer Co.'s Standard High Grade Acid Phosphate	14.00	....	....
Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate	14.00	....	....
Durham Fertilizer Co.'s Blacksburg Dissolved Bone	13.00	....	....
Durham Fertilizer Co.'s N. C. Farmers' Alli- ance Official Acid Phosphate.....	13.00	....	....
Durham Fertilizer Co.'s Double Bone Phos- phate	13.00	....	....
Durham Fertilizer Co.'s Durham Acid Phos- phate	12.00	....	....
Durham Fertilizer Co.'s Great Wheat Grower.	10.50	....	1.50
Durham Fertilizer Co.'s Diamond Wheat Mix- ture	10.00	....	3.00
Durham Fertilizer Co.'s Standard Wheat and Corn Grower	10.00	....	2.00
Durham Fertilizer Co.'s Blue Ridge Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Standard Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Durham Bone and Potash Mixture	10.00	....	2.00
Durham Fertilizer Co.'s L. & N. Special.....	9.00	2.47	2.00
Durham Fertilizer Co.'s Standard Guano.....	9.00	1.65	2.00
Durham Fertilizer Co.'s Durham Ammoniated Fertilizer	9.00	1.65	1.00
Durham Fertilizer Co.'s Special Plant and Truck Fertilizer	8.00	4.12	3.00
Durham Fertilizer Co.'s Durham High Grade.	8.00	3.29	4.00
Durham Fertilizer Co.'s Gold Medal Brand Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s Yellow Leaf Tobacco Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s N. C. Farmers' Alli- ance Official Guano.....	8.00	2.06	3.00
Durham Fertilizer Co.'s Pride of Durham To- bacco Grower	8.00	2.06	3.00
Durham Fertilizer Co.'s Raw Bone Superphos- phate for Tobacco.....	8.00	2.06	2.00
Durham Fertilizer Co.'s Raw Bone Superphos- phate	8.00	2.06	1.50
Durham Fertilizer Co.'s Genuine Bone and Pe- ruvian Guano	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Progressive Farmer Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Carr's Special Wheat Grower	8.00	....	4.00
Durham Fertilizer Co.'s Best Potato Manure.	7.00	5.76	7.00
Lynchburg Guano Co.'s Ironside Acid Phos- phate	16.00	....	....
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate.....	14.00	....	....
Lynchburg Guano Co.'s Arvonja Acid Phos- phate	13.00	....	....
Lynchburg Guano Co.'s Spartan Acid Phos- phate	12.00	....	....
Lynchburg Guano Co.'s Alpine Mixture.....	10.00	....	5.00
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture.....	10.00	....	4.00
Lynchburg Guano Co.'s Dissolved Bone and Potash	10.00	....	2.00
Lynchburg Guano Co.'s Independent Standard.	8.50	1.65	2.00
Lynchburg Guano Co.'s Bright Belt Guano...	8.00	2.47	3.00
Lynchburg Guano Co.'s Solid Gold Tobacco...	8.00	2.26	4.00
Lynchburg Guano Co.'s New Era.....	8.00	1.65	3.00
Lynchburg Guano Co.'s Lynchburg Soluble...	8.00	1.65	2.00
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Reliable Acid Phosphate.....	14.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Best Acid Phosphate.....	13.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Soluble Bone	12.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Bone and Potash	10.00	....	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Trucker and Tomato Grower.....	8.00	4.12	5.00
Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Amazon H. G. Special Tobacco Guano.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Cooper's Bright Tobacco Fertilizer.....	8.00	2.06	3.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Made Especially for Tobacco	8.00	2.06	2.00
Norfolk and Carolina Chemical Co.'s Peanut Grower	8.00	1.00	4.00
Norfolk and Carolina Chemical Co.'s Crescent Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s High Grade Acid Phosphate	14.00	....	....
Old Dominion Guano Co.'s Bone Phosphate...	13.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Dominion Guano Co.'s Royster's Acid Phosphate	12.00	....	....
Old Dominion Guano Co.'s Obelisk Brand Bone and Potash.....	10.00	....	4.00
Old Dominion Guano Co.'s Planter's Bone and Potash Mixture.....	10.00	....	3.00
Old Dominion Guano Co.'s Old Dominion Alkaline Bone and Potash.....	10.00	....	2.00
Old Dominion Guano Co.'s Horne's Cotton Fertilizer	9.00	2.06	3.00
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano.....	9.00	1.65	1.00
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer.....	8.00	2.47	3.00
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer.....	8.00	2.47	3.00
Old Dominion Guano Co.'s Osceola Tobacco Guano	8.00	2.06	3.00
Old Dominion Guano Co.'s Farmers' Friend Fertilizer	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Special Wheat Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Tobacco Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Soluble Guano	8.00	1.65	2.00
Old Dominion Guano Co.'s Bullock's Cotton Grower	8.00	1.65	2.00
Old Dominion Guano Co.'s Miller's Special Wheat Mixture	8.00	....	4.00
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	7.00	5.76	7.00
Old Dominion Guano Co.'s Old Dominion Potato Manure	7.00	4.12	8.00
Old Dominion Guano Co.'s 7 Per Cent Truck Fertilizer	6.00	5.76	6.00
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	6.00	5.76	5.00
Old Dominion Guano Co.'s Old Dominion Special Sweet Potato Guano.....	6.00	1.65	6.00
Old Dominion Guano Co.'s 70 Per Cent Truck Fertilizer	5.00	8.24	2.50
Powers, Gibbs & Co.'s Almont High Grade Acid Phosphate	14.00	....	....
Almont Acid Phosphate.....	12.00	....	....
Fulp's Acid Phosphate.....	13.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Best Acid Phosphate	13.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Acid Phosphate	12.00	....	....
Powers, Gibbs & Co.'s Acid Phosphate and Potash	10.50	....	1.50
Powers, Gibbs & Co.'s Almont Wheat Mixture.....	10.00	....	3.00
Powers, Gibbs & Co.'s Dissolved Bone and Potash	10.00	....	2.00
Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano	9.00	2.47	2.00
Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano	8.00	3.29	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone.....	8.00	3.29	4.00
Powers, Gibbs & Co.'s Old Kentucky High Grade Manure	8.00	2.47	3.00
Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano	8.00	2.47	2.00
Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.....	8.00	2.06	3.00
Powers, Gibbs & Co.'s Powers' Ammoniated Guano	8.00	2.06	2.00
Powers, Gibbs & Co.'s Gibbs' Ammoniated Guano	8.00	2.06	1.50
Powers, Gibbs & Co.'s Almont Soluble Ammoniated Guano	8.00	1.65	2.00
Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Ammoniated Guano.....	8.00	1.65	2.00
Powers, Gibbs & Co.'s Eagle Island Ammoniated	8.00	1.65	2.00
Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Red Cross 14 Per Cent Acid Phosphate	14.00	....	....
Southern Chemical Co.'s Victor Acid Phosphate	13.00	....	....
Southern Chemical Co.'s Chatham Acid Phosphate	13.00	....	....
Southern Chemical Co.'s Reaper Grain Application	12.00	....	3.00
Southern Chemical Co.'s Tar Heel Acid Phosphate	12.00	....	....
Southern Chemical Co.'s Horseshoe Acid Phosphate	12.00	....	....
Southern Chemical Co.'s Quickstep Bone and Potash	11.00	....	5.00
Southern Chemical Co.'s Solid South.....	10.00	....	6.00
Southern Chemical Co.'s Winner Grain Mixture	10.00	....	4.00
Southern Chemical Co.'s Farmers' Pride Bone and Potash	10.00	....	3.00
Southern Chemical Co.'s Winston Bone and Potash Compound	10.00	....	2.00
Southern Chemical Co.'s Mammoth Corn Grower	10.00	....	2.00
Southern Chemical Co.'s Mammoth Wheat and Grass Grower	10.00	....	2.00
Southern Chemical Co.'s Sun Brand Guano...	9.00	2.06	5.00
Southern Chemical Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8.00	2.47	2.50
Southern Chemical Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8.00	2.06	3.00
Southern Chemical Co.'s Electric Tobacco Guano	8.00	1.65	2.00
Southern Chemical Co.'s Electric Standard Guano	8.00	1.65	2.00
Southern Chemical Co.'s Yadkin Complete Fertilizer	8.00	1.65	2.00
Southern Chemical Co.'s Chick's Special Wheat Compound	8.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
J. G. Tinsley & Co.'s Powhatan Acid Phosphate	14.00	....	....
J. G. Tinsley & Co.'s Tinsley's Dissolved S. C. Bone	13.00	....	....
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate	12.00	....	....
J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture	10.00	....	2.00
J. G. Tinsley & Co.'s Tinsley's Tobacco Fertilizer	8.00	3.29	2.50
J. G. Tinsley & Co.'s Richmond Brand Guano.	8.00	2.47	3.00
J. G. Tinsley & Co.'s Peanut Grower.....	8.00	1.00	4.00
J. G. Tinsley & Co.'s Killickinick Tobacco Mixture	8.00	2.06	3.00
J. G. Tinsley & Co.'s Lee Brand Guano.....	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Brand Guano.	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Tobacco Guano.	8.00	1.65	2.00
J. G. Tinsley & Co.'s Tinsley's Special Irish Potato Guano	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Ammoniated Guano for Beans, Peas, Cabbage, Strawberries	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's Irish Potato Guano	6.00	4.94	6.00
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower	6.00	3.29	4.00
J. G. Tinsley & Co.'s Tinsley's Top Dresser....	5.00	9.06	....
J. G. Tinsley & Co.'s Tinsley's 10 Per Cent Truck Guano	5.00	8.24	2.50
S. W. Travers & Co.'s Champion Acid Phosphate	16.00	....	....
S. W. Travers & Co.'s Travers' Dissolved Acid Phosphate	14.00	....	....
S. W. Travers & Co.'s Standard Dissolved S. C. Bone	13.00	....	....
S. W. Travers & Co.'s Capital Dissolved Bone.	12.00	....	....
S. W. Travers & Co.'s Capital Bone and Potash Compound	10.00	....	2.00
S. W. Travers & Co.'s Capital Truck Fertilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Capital Tobacco Fertilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Big Leaf Tobacco Grower	8.00	2.47	3.00
S. W. Travers & Co.'s Capital Cotton Fertilizer	8.00	2.06	2.00
S. W. Travers & Co.'s National Fertilizer....	8.00	1.65	2.00
S. W. Travers & Co.'s National Special Tobacco Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Beef, Blood and Bone Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Peanut Grower.....	8.00	1.00	4.00
S. W. Travers & Co.'s Travers' Special Wheat Compound	8.00	....	4.00
S. W. Travers & Co.'s Travers' 7 Per Cent Truck Fertilizer	6.00	5.76	5.00
Virginia State Fertilizer Co.'s Bull Run Acid Phosphate	16.00	....	....
Virginia State Fertilizer Co.'s Gilt Edge Brand Acid Phosphate	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Virginia State Fertilizer Co.'s Clipper Brand Acid Phosphate	13.00	....	....
Virginia State Fertilizer Co.'s Lurich Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Alps Brand Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Mountain Top Bone and Potash.....	10.00	....	5.00
Virginia State Fertilizer Co.'s XX Potash Mix- ture	10.00	....	4.00
Virginia State Fertilizer Co.'s Virginia State Dissolved Bone and Potash.....	10.00	....	2.00
Virginia State Fertilizer Co.'s Number One Soluble Guano	9.00	1.65	2.00
Virginia State Fertilizer Co.'s Highland King. Virginia State Fertilizer Co.'s Gamecock Spe- cial for Tobacco.....	9.00	1.65	1.00
Virginia State Fertilizer Co.'s Virginia State High Grade Tobacco Guano.....	8.50	1.65	2.00
Virginia State Fertilizer Co.'s Bull Dog Solu- ble Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Dunnington's Special Formula for Tobacco.....	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Peerless To- bacco Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Buffalo Guano. Virginia State Fertilizer Co.'s Austrian To- bacco Grower	8.00	2.06	3.00
Virginia State Fertilizer Co.'s Gilt Edge Spe- cial Tobacco Guano	8.00	2.06	2.00
Virginia State Fertilizer Co.'s Virginia State Guano	8.00	2.06	2.00
Virginia State Fertilizer Co.'s Battle Axe To- bacco Guano	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.00	....	4.00
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Raw Bone Meal.....Total	21.73	4.10	....
<i>Williams & Clark Fertilizer Co., Charleston, S. C.—</i>			
Standard Americus Ammoniated Bone Super- phosphate	9.00	1.85	1.00
<i>Winborne-Brown Guano Co., Norfolk, Va.—</i>			
High Grade Acid Phosphate.....	16.00	....	....
Standard Acid Phosphate.....	14.00	....	....
Soluble Bone and Potash.....	10.00	....	2.00
Big Triumph Guano.....	8.00	3.30	4.00
Farmers Select Guano.....	8.00	2.47	4.00
King Tammy Guano.....	8.00	2.47	3.00
Winborne's Tobacco Guano.....	8.00	2.47	3.00
Champion Crop Grower.....	8.00	1.65	2.00
Winborne's Excelsior Guano.....	8.00	1.65	2.00
Standard Eureka Guano.....	8.00	1.65	2.00
Climax Peanut Guano.....	8.00	.82	4.00
High Grade Top Dresser.....	7.00	7.82	3.00
Premium Top Dresser.....	6.00	7.40	3.00
Big Crop 7 Per Cent Guano.....	5.00	5.75	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	15.65	....
Muriate of Potash.....	50.00
Genuine German Kainit.....	12.00

T. W. Wood & Sons, Richmond, Va.—

Wood's Pure Animal Bone.....Total	23.00	2.47	....
Standard H. G. Acid Phosphate.....	16.00	....	....
Standard High Grade Acid Phosphate.....	14.00	....	....
Wood's Corn Fertilizer.....	10.00	.82	1.00
Standard Bone and Potash Mixture.....	10.00	....	2.00
Standard Corn Fertilizer.....	9.00	1.23	1.00
Standard Wheat Fertilizer.....	9.00	1.23	1.00
Standard Crop Grower Fertilizer.....	9.00	1.03	2.00
Standard High Grade Trucker Fertilizer....	8.00	4.93	6.00
Standard Vegetable Fertilizer.....	8.00	2.47	3.00
Standard Potato Fertilizer.....	8.00	1.65	5.00
Standard Grain and Grass Fertilizer.....	8.00	1.65	2.00
Wood's Lawn Enricher.....	6.00	2.47	3.00
Nitrate of Soda.....	....	15.63	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	48.00
Kainit	12.00

Wessell, Duval & Co., New York, N. Y.—

Nitrate of Soda.....	14.85
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S. L. Warren, Calypso, N. C.—

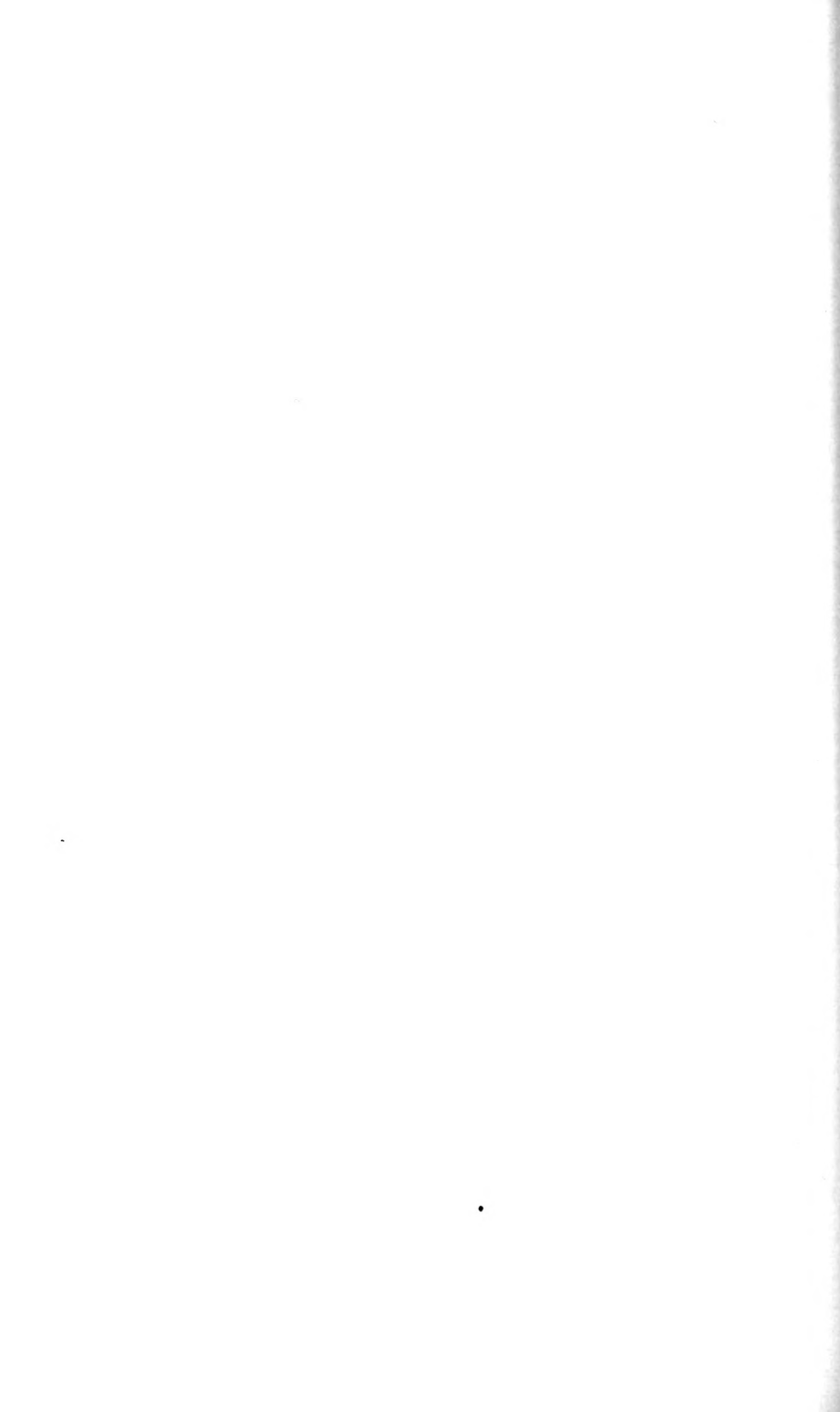
Acid	16.00
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Wilson Chemical Co., Wilson, N. C.—

16 Per Cent Acid Phosphate.....	16.00
14 Per Cent Acid Phosphate.....	14.00
East Carolina Tobacco Grower.....	8.00	2.47	3.00
Brag Cotton Grower.....	8.00	2.05	3.00
McGee's Potato Special.....	6.00	3.30	8.00

The J. R. Young Fertilizer Co., Norfolk, Va.—

High Grade 16 Per Cent Acid Phosphate.....	16.00	....	....
Special Bone and Potash Compound.....	10.00	....	11.00
J. R. Young's Bone Mixture.....	10.00	....	4.00
Young's Bone and Potash Guano.....	10.00	....	2.00
Bone and Potash Mixture.....	10.00	....	2.00
J. R. Young 2¾-9-2 Special Guano.....	9.00	2.26	2.00
J. R. Young's 4-8-4 Crop Grower.....	8.00	3.29	4.00
J. R. Young's New Process 3-8-3 Guano for Tobacco	8.00	2.47	3.00
J. R. Young's New Process 2-8-2 Guano for Cotton, Corn and Peanuts.....	8.00	1.65	2.00
Pasquotank 5-6-7 Potato Grower.....	6.00	4.11	7.00
J. R. Young's Special Guano for Potatoes....	6.00	4.11	5.00
J. R. Young's Improved Fish and Bone Manure for All Crops.....	6.00	3.29	4.00
J. R. Young's New Process Grower.....	5.00	5.76	3.50
J. R. Young's 3-6-6 Special Guano for S. P....	6.00	2.47	6.00
J. R. Young's 4-4-6 Special for Tobacco.....	4.00	3.29	6.00
Nitrate of Soda.....	....	14.85	....
J. R. Young's German Kainit.....	....	....	12.00
Genuine German Kainit.....	....	....	12.00



LEAF TOBACCO SALES FOR MARCH, 1911.

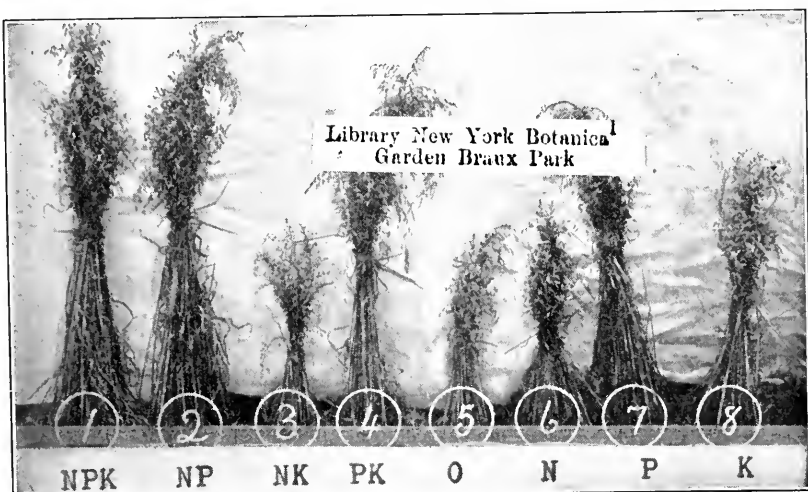
Pounds sold for producers, first hand.....	3,289,518
Pounds sold for dealers.....	179,066
Pounds resold for warehouses.....	276,106
Total	<u>3,744,690</u>

THE BULLETIN
OF THE
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DEPARTMENT OF AGRICULTURE
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**A PRELIMINARY REPORT ON THE
MOUNTAIN SOILS.**

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

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T. F. PARKER.....	Second Assistant Agronomist.
ELDEN BAYLEY.....	Third Assistant Agronomist.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, MAY 10, 1911.

SIR:—Eleven years ago plans were made and put in operation for the systematic investigation of the soils and crops of the State, which included, (1), a survey or mapping of the soils to show the location and extent of the different types; (2), the analyses of the soils to determine the amount of their important plant food constituents; and, (3), the conduct on the different soils of field experiments to ascertain the fertilizer requirements for most profitable crops and their improvement, and the crops to which they were best adapted.

This report covers in a preliminary way the work for the mountain section of the State. B. W. Kilgore is responsible for the inauguration, general plans and direction of the work; the analyses have been made by W. G. Haywood, J. M. Pickel, L. L. Brinkley, E. W. Thornton, W. H. Strowd, J. Q. Jackson and others in the laboratory; W. E. Hearn and G. M. MacNider did a large part of the work in the preparation of the soil maps, and Mr. Hearn has written the description of the soils for this report; the rest of the report, in the main, has been prepared by E. L. Worthen, who has also conducted the field work the past year.

Similar reports are being prepared for the piedmont and eastern soils. More data is available for these than the mountain soils, and a general or more comprehensive report of the work on all the soils in the State will follow in due time.

I recommend the publication of this as the May Bulletin.

Respectfully,

B. W. KILGORE,
Director of Test Farms.

TO HON. W. A. GRAHAM,
Commissioner of Agriculture.

A PRELIMINARY REPORT ON THE MOUNTAIN SOILS.

BY B. W. KILGORE, E. L. WORTHEN AND W. E. HEARN.

SUMMARY.

This report covers in a preliminary way what has been done during the past eleven years in a systematic study of the soils of the mountain section, with a view to ascertaining what the different mountain soils are, where they are located, their extent, the amount of different plant food constituents which they contain, their fertilizer needs for most profitable crops and for permanent improvement, and the crops to which they are best adapted.

A clear description is given of each kind or type of soil so that the farmer will know that he is operating on that particular kind of soil or soils. As far as the work has progressed maps are available showing the location and extent of the different type soils.

A rather large number of analyses have been made of the various types of soils in different parts of the Mountain section. These analyses show the total amount of the more important plant food constituents in these soils. While there is considerable variation, all the mountain soils have been found to be very high in potash, low in phosphoric acid, and to contain a fair amount of lime. The amount of nitrogen varies with the quantity of vegetable or organic matter in the soil. In most of the mountain soils there is sufficient potash in the surface soil to produce maximum crops for three hundred to four hundred years, while twenty to fifty such crops would entirely exhaust the phosphoric acid.

Fertilizer experiments conducted on the Buncombe and Transylvania Test Farms and the experimental fields at Blantyre and Hendersonville show that crops are not benefited by applications of potash, but that phosphoric acid first and nitrogen second are the controlling constituents in increasing yields. In the use of fertilizers for the production of profitable crops or for the improvement of the soil, liberal applications of phosphates must be made, and nitrogen must also be supplied either in fertilizers or from soil-improving crops.

Lime has increased yields on most of the soils, but this may be a temporary benefit and at the expense of the organic matter in the soil, the lime liberating the nitrogen in the organic matter for the use of the crops.

The soil analyses and field experiments point the way to the proper use of fertilizer on these soils and to their improvement. Phosphates must be used liberally and nitrogen, either in fertilizers or as soil-improving crops, or both, must be used with the phosphates. How to supply the phosphates most economically and to furnish the nitrogen in soil-improving crops or in fertilizers is discussed in the report. Other reports will follow from time to time giving results of field experiments now in progress and outlined in this report, as well as additional analyses of soils, as the work in surveying and mapping the soils of the section progresses.

INTRODUCTION.

The State Department of Agriculture began a systematic study of the soils of the State in the spring of 1900. The methods of investigation include three distinct lines of work:

1. A soil survey of the individual counties is being made showing the location, extent and boundaries of each different soil type. This division of the work has been carried on in co-operation with the United States Bureau of Soils.

2. Samples of the various soils found in each county are collected and analyzed in order to determine what amounts of the different elements of plant food are contained in each type.

3. Test farms and experimental plats have been established on the more important soils, where crops have been grown under field conditions with various fertilizer applications. By the combination of these plat results with the analyses of the soil types, we hope to determine definite methods of crop rotations combined with the best fertilization for each soil type, which shall be profitable and at the same time increase from year to year the productivity of the soil.

The detailed soil survey has included all of Transylvania and Henderson counties, and parts of Buncombe, Madison, Haywood, Yancey, Mitchell and McDowell counties.

This report deals largely with the chemical composition of the more important soils, and the results derived from the plat experiments.

LOCATION AND EXTENT.

That part of North Carolina known universally as the Mountain region, includes approximately the western one-sixth of the State. It lies just west of the Piedmont Plateau section into which it merges so gradually that it is impossible to draw a sharp division between them. The division passes through Surry, Wilkes, Caldwell, Burke, McDowell, Rutherford and Polk counties, as they form the foothills.

Besides parts of these counties, the Mountain section includes all of Cherokee, Clay, Graham, Macon, Swain, Jackson, Haywood, Transylvania, Henderson, Buncombe, Madison, Yancey, Mitchell, Watauga, Ashe and Alleghany counties.

GEOLOGY AND SOIL FORMATION.

The soils of this region are all of residual origin, that is, formed from the decay of the underlying rocks. In some ancient period of the earth's history, probably as it was cooling and contracting, this

whole section was pushed up high above the lands to the east and the west. Each separate mountain chain represents an old fold in the earth's crust. At this time there was no soil, but the surface consisted of undecomposed rock. The slow but constant action for centuries of nature's agencies of decomposition such as rain, sunshine, freezing and thawing, vegetation and the like, has gradually broken-down these native rocks into very small particles, which, mixed with partly decomposed organic or vegetable matter forms the present soil. In many sections, especially on the steep mountain slopes, where erosion has gone on as rapidly as decomposition, bare rocks still form the surface. More surprising, however, is the uniform soil covering which is often ten to even fifty feet in thickness. Practically all of these upland mountain soils have been derived in this way from igneous and metamorphic rocks, mainly gneisses, schists and granites. The sandy loams, sands, and most of the loams are products of the granites and gneisses; while the heavy loams, clay loams and clays have been derived for the most part from the schists.

CLIMATE.

The climate of this section is very favorable for extensive agricultural development. The rainfall and temperature vary considerably in different parts of the area. In general, however, the rainfall is large. The annual rainfall is greater than in any other section of the State. Occasionally during the summer months several inches of rain will fall within a few hours, frequently resulting in the serious erosion of the sloping fields, and the flooding of the alluvial lands along the streams. Often there is considerable snowfall during the winter and the higher mountain chains are commonly covered with more or less snow throughout the winter months.

The climatic conditions are well adapted to grain and stock farming as well as to gardening and fruit growing. The growing season is comparatively short, the last killing frost in the spring generally occurring from the middle to the latter part of April, though it may freeze well up into May. Killing frosts in the fall may be expected about the middle of October.

The following table gives the average precipitation and temperature at several points in the section:

NORMAL MONTHLY AND ANNUAL TEMPERATURE AND PRECIPITATION.

TEMPERATURE

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Avr.
Asheville.....	38	40	46	54	63	69	72	71	65	54	45	39	55
Lenoir.....	37	40	46	56	65	72	75	74	66	56	46	38	56
Hendersonville.	37	38	46	53	64	70	73	73	66	56	47	39	55
Highlands.....	34	35	42	50	58	65	67	66	60	51	42	35	50
Average.....	36.5	38.3	45	53.3	62.5	69	71.8	71	64.3	54.3	45	37.8	54

PRECIPITATION—INCHES.

Asheville.....	3.0	3.7	4.2	3.4	3.5	4.1	4.9	4.6	2.9	2.6	2.7	3.0	42.6
Lenoir.....	4.1	4.5	4.6	3.8	4.7	4.6	4.9	5.9	4.5	3.4	3.2	3.8	52.0
Hendersonville.....	4.6	7.4	7.6	5.0	4.2	6.4	5.9	7.8	4.6	4.2	3.0	5.2	65.9
Highlands.....	6.2	8.5	7.8	6.5	4.4	6.9	6.8	7.6	5.8	5.2	5.6	6.9	78.2
Average.....	4.5	6.0	6.1	4.7	4.2	5.5	5.6	6.5	4.5	4.4	3.6	4.7	59.7

GENERAL CHARACTER AND AGRICULTURAL CONDITIONS.

The Blue Ridge on the east and the Great Smoky or Bald Mountains on the northwest constitute the main mountain ranges, and lying between them is an irregular mountain table-land of considerable size. Many narrow but beautiful valleys have been formed in this mountain region.

The elevation of the mountain ranges varies from 2,000 to more than 6,000 feet above sea level. The lower elevations are found at the foothills of the Blue Ridge and in the inter-mountain area. In the southern portion the mountains are not so rugged and present fewer abrupt slopes than are found in the Great Smoky Mountains and other sections. Many steep peaks and rough ridges with precipitous sides, and intervening valleys and gorges constitute the general topography of the true Mountain section. Along some of the prominent rivers beautiful valleys have been formed, and in these valleys and in the inter-mountain area agriculture has been most extensively developed.

There are few large towns or cities in this section of the State, the population being largely agricultural. Farming has not developed so extensively as in the eastern part of the State, however; the farms are small and most often tended by the owner or tenant, and family. Practically all the farm produce is used within the immediate locality.

The cleared land is estimated to be about twenty per cent of the area. This includes the greater part that is suitable for cultivation, much that is too rough for cultivated crops and should be left in pas-



PLATE I.—Farm Scene in Mountain Section

ture or orchard, and some that is so rough that it would better have remained in virgin forest.

Fruit production, that of apples in particular, has been extensively developed in many localities. There are thousands of acres that are too rough for the production of general farm crops, but which are admirably adapted to the production of apples. Grain farming could be more extensively developed, however, and with better fertilization would prove more profitable. Much of the section is suitable to livestock production, and combined with grain farming this should prove profitable, and should aid materially in building up the fertility of the often run-down farms.

CLASSIFICATION OF SOILS.

The soils of the Mountain section are somewhat analogous to those of the Piedmont Plateau, but in all cases have been considered as belonging to separate types. All the upland soils encountered so far in the detail soil survey have been considered as belonging to the one broad series known as Porter's. The various types of this series have been formed from schist, gneisses and granites. The individual types of this series are more dissimilar, perhaps, than is commonly the case, but it has not seemed possible to form a new series in any of the areas so far surveyed. With the extension of the survey to other counties, it is very possible that representative types of other soil series will be found. There is little doubt, however, that the great bulk of the upland falls within the present limits of the Porter's series. The two extensive upland soils are loam and sandy loam, while three other types are represented by smaller areas. These are the clay, sand, and black loam.

The valley and bottom land soils are included in the Toxaway series. These are of alluvial origin, modified by colluvial wash, and have been formed from the washing of the Porter's series and deposited by the streams. The surface of these soils is flat, or level with a gradual slope towards the streams. They lie at sufficient elevations above the normal water level of the streams so as to be drained. However, most of these soils are subject to frequent overflow. The two types thus far found are the Toxaway loam and Toxaway fine sandy loam.

Following is a brief description of each of these seven important types, including the average chemical and mechanical analysis of each. Part of these chemical analyses are of samples prepared with a $\frac{1}{2}$ mm. and part with a 2 mm. sieve. As the percentage composition is materially affected by these different methods of preparations they are averaged separately. The mechanical analyses are taken largely from published reports of the Bureau of Soils. The chemical analyses

of the individual samples along with their location are brought together at the end of the bulletin.

PORTER'S SANDY LOAM.

The surface soil of the Porter's sandy loam consists of a yellowish-gray to gray, medium to coarse sandy loam varying in depth from 6 to 12 inches. In a few places a gray fine sandy loam is encountered while in other spots where erosion has been active or where the rocks are more thoroughly decomposed a reddish to brown sandy loam or loam is found. The heavily forested areas are usually darker in color and contain more organic matter than the soil in the cultivated fields. In many places mica scales occur in the soil and here and there quartz gravel and rock fragments are scattered over the surface. The Porter's sandy loam is a mellow, friable soil, easily tilled and if properly managed never bakes or clods.

The subsoil consists of a reddish or yellowish brown, heavy, sticky, sandy loam which passes into a red or yellow clay loam or clay. In many places it is a stiff, red clay, while in other places it is very friable and the disintegrated rock comes near the surface.

AVERAGE CHEMICAL ANALYSIS OF PORTER'S SANDY LOAM.

Percentage Composition on the Dry Basis.						Pounds of Total Plant Food Constituents per Acre.			
						Surface Soil to depth of 6 $\frac{1}{2}$ inches, 2,000,000 lbs.			
						Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime CaO.
Surface } 2mm.	6.23	.0799	.0599	3.40	.734	2394	1152	64853	14188
Subsoil } 2mm.	6.32	.0286	.0628	3.01	.706	2276	4980	235832	55794
Surface } $\frac{1}{2}$ mm.	5.32	.0514	.044	2.768	1.983	668	574	37413	27366
Subsoil } $\frac{1}{2}$ mm.	4.72	.0272	.0596	2.546	1.871	1441	3101	135971	96677

AVERAGE MECHANICAL ANALYSIS.

	Gravel. Per cent.	Coarse sand. Per cent.	Medium sand. Per cent.	Fine sand. Per cent.	Very fine sand. Per cent.	Silt. Per cent.	Clay. Per cent.
Surface soil.....	5.41	13.06	8.62	23.34	15.14	21.08	12.93
Subsoil	4.998	12.02	7.53	21.50	12.89	18.67	22.52

PORTER'S SAND.

This is a small and unimportant type. The soil to an average depth of 8 inches is a yellowish gray or gray, medium to coarse sandy or light sandy loam. In many localities there are from 10 to 15 per

cent of fine rock fragments in the soil, and occasionally a few granite boulders are strewn upon the surface.

The subsoil is a yellowish to brownish sandy loam or sticky sand which commonly grades into the disintegrated granite at 20 inches. In some places this soft rock comes to within a few inches of the surface and even outcrops frequently as there is a gradual gradation from the surface soil to the rock.

AVERAGE CHEMICAL ANALYSIS OF PORTER'S SAND.

		Percentage Composition on the Dry Basis.					Pounds of Total Plant Food Constituents per Acre. Surface Soil to depth of 6½ inches, 2,500,000 lbs. Subsoil to depth of 28 inches, 10,000,000 lbs.			
		Volatile matter.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.
Surface	} ½ mm. --	2.17	.0375	.008	.67	1.515	501	128	10505	26705
Subsoil		2.27	.021	.009	.635	1.49	1378	590	41696	97840

AVERAGE MECHANICAL ANALYSIS.

	Gravel. Per cent.	Coarse sand. Per cent.	Medium sand. Per cent.	Fine sand. Per cent.	Very fine sand. Per cent.	Silt. Per cent.	Clay. Per cent.
Surface soil	8.79	16.69	9.80	21.39	11.44	16.85	14.67
Subsoil.....	10.06	21.40	12.73	23.18	10.35	11.92	10.19

PORTER'S LOAM.

The surface soil of the Porter's loam consists of a dark brown, reddish brown, or yellowish brown loam from 6 to 14 inches deep. The surface few inches is darker than the underlying soil on account of the accumulation of vegetable matter, as practically all of the type is forested. Occasionally in local areas where the soil is thinly forested on foothills and ridges small spots of grayish loam occur, and where the granitic rock comes near the surface the sand content is greatly increased. This type is made up of silt, clay and the various grades of sand in about equal proportions, thus giving a mellow, smooth soil, and one easily cultivated.

The subsoil to a depth of 3 feet or more varies from a reddish brown or red to yellowish brown clay or clay loam. In some localities where it is influenced by the mica schists the subsoil is deeper red in color and both soil and subsoil contain a considerable amount of mica scales.

The Porter's loam is the largest and most important type in the Mountain section, being typically developed on the mountain slopes.

AVERAGE CHEMICAL ANALYSIS OF PORTER'S LOAM.

		Percentage Composition on the Dry Basis.					Pounds of Total Plant Food Constituents per Acre. Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
		Volatile matter.	Nitrogen.	Phosphoric acid.	Potash.	Lime CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime CaO.
Surface	} 2 mm.....	9.25	.1074	.1278	2.007	.259	2010	2330	38285	4929
Subsoil		7.93	.0376	.1591	2.00	.305	2848	12021	148547	23413
Surface	} ½ mm.....	4.00	.087	.039	1.89	1.70	1467	678	31088	27769
Subsoil		5.52	.033	.006	1.89	1.76	2294	445	130061	122003

AVERAGE MECHANICAL ANALYSIS.

	Gravel. Per cent.	Coarse sand. Per cent.	Medium sand. Per cent.	Fine sand. Per cent.	Very fine sand. Per cent.	Silt. Per cent.	Clay. Per cent.
Surface Soil.....	2.59	8.72	6.61	19.25	10.25	28.92	23.24
Subsoil	1.70	7.72	5.81	17.17	8.44	23.45	35.40

PORTER'S BLACK LOAM.

The soil of this type is a rich, loose, mellow loam from 8 to 36 inches deep. The color varies from dark brown in thinly forested areas to deep black in shaded coves. Where there is a thick growth of rhododendron and ferns so much vegetable matter has accumulated that it gives the soil a mucky appearance. The subsoil is a yellowish brown to dark brown heavy loam or red clay. The soil is developed at high altitudes, usually from 3,000 to 6,500 feet, and occupies the well shaded coves or tops of mountains. It has been derived from the same character of rocks as the Porter's loam, the only difference being the accumulation of organic matter by virtue of its position.

AVERAGE CHEMICAL ANALYSIS OF PORTER'S BLACK LOAM.

		Percentage Composition on the Dry Basis.					Pounds of Total Plant Food Constituents per Acre. Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
		Volatile matter.	Nitrogen.	Phosphoric acid.	Potash.	Lime CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime CaO.
Surface	} 2 mm.....	18.63	.475	.345	2.05	1.175	9132	6625	39646	22619
Subsoil		12.06	.245	.208	2.185	1.125	18271	15650	166206	84519
Surface	} ½ mm.....	15.05	.3237	.185	1.941	1.421	5093	2943	29408	20369
Subsoil		9.12	.163	.1161	1.958	1.597	9917	7168	76504	95037

AVERAGE MECHANICAL ANALYSIS.

	Gravel. Per cent.	Coarse sand. Per cent.	Medium sand. Per cent.	Fine sand. Per cent.	Very fine sand. Per cent.	Silt. Per cent.	Clay. Per cent.
Surface Soil.....	4.93	10.03	8.00	17.85	8.36	28.77	24.63
Subsoil.....	4.39	8.84	6.51	16.60	10.64	29.13	23.88

PORTER'S CLAY.

The soil consists of a red or brown clay loam or loam varying in depth from 4 to 7 inches. In a few places the soil is a yellowish or gray loam, while on a few of the eroded knolls a red, stiff clay is found on or near the surface. Occasionally a few shale or schist fragments and even quartz gravel occur on the surface, and also a little mica is present in the subsoil. Generally the soil is easy to handle as there is enough fine sand and silt to cause it to be friable.

The subsoil for typical areas is a stiff red clay to a depth of 3 feet or more, but yellowish and reddish yellow mottlings may occur near the base where aeration has been lacking. On some of the ridges and sides of the knolls the partly decomposed rock comes to within 3 feet of the surface. This type occupies the knolls, ridges and foot-hills, bordering the bottom lands.

AVERAGE CHEMICAL ANALYSIS OF PORTER'S CLAY.

Percentage Composition on the Dry Basis.						Pounds of Total Plant Food Constituents per Acre.			
						Surface Soil to depth of 6½ inches, 2,000,000 lbs.			
						Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter.	Nitro-gen.	Phos-phoric acid.	Potash.	Lime. CaO.	Nitro-gen.	Phos-phoric acid.	Potash.	Lime. CaO.
Surface } 2 mm.....	8.10	.097	.067	1.63	.4924	1857	1290	30717	9136
Subsoil } 2 mm.....	14.39	.03	.1326	1.908	.0926	2382	8285	151334	7372
Surface } ½ mm.....	7.58	.087	.0417	.722	1.579	1454	860	12416	26388
Subsoil } ½ mm.....	8.77	.0427	.0567	.682	1.544	3175	482	50027	112841

AVERAGE MECHANICAL ANALYSIS.

	Gravel. Per cent.	Coarse sand. Per cent.	Medium sand. Per cent.	Fine sand. Per cent.	Very fine sand. Per cent.	Silt. Per cent.	Clay. Per cent.
Surface Soil.....	2.75	6.76	5.46	17.56	10.37	30.75	25.81
Subsoil.....	2.02	5.54	4.29	12.24	8.76	28.33	38.55

TOXAWAY LOAM.

The surface soil of the Toxaway loam consists of a dark gray to black mellow loam or silty loam 8 to 15 inches deep. The darker areas contain a larger amount of organic matter. In local spots a dark brown loam or silty loam or very fine micaceous sandy loam is found.

The subsoil varies from a dark brown or yellowish silty loam to clay. In some places the silty material grades into a yellow or white clay locally called "pipe clay." Occasionally at 30 to 36 inches a highly micaceous fine sandy loam is encountered.

AVERAGE CHEMICAL ANALYSIS OF TOXAWAY LOAM.

		Percentage Composition on the Dry Basis.					Pounds of Total Plant Food Constituents per Acre.			
		Volatile matter.	Nitro-gen.	Phos-phoric acid.	Potash.	Lime. CaO.	Nitro-gen.	Phos-phoric acid.	Potash.	Lime. CaO.
Surface	} 2 mm.-----	18.39	.356	.282	1.65	.497	7126	5640	34414	9943
Subsoil		9.00	.109	.136	2.04	.60	8734	10880	163667	48000

AVERAGE MECHANICAL ANALYSIS.

	Gravel Per cent.	Coarse sand. Per cent.	Medium sand. Per cent.	Fine sand. Per cent.	Very fine sand. Per cent.	Silt. Per cent.	Clay. Per cent.
Surface Soil.-----	.50	4.87	2.73	7.83	5.13	51.33	27.
Subsoil.-----	.20	.93	.73	7.20	6.13	46.83	37.

TOXAWAY FINE SANDY LOAM.

The surface soil of typical areas of this type consists of a light to dark brown mellow fine sandy loam to a depth of 8 to 12 inches. Scattered throughout the soil are small areas or narrow bands of fine loamy sand, and also a few spots of gravelly sand, especially the latter on the smaller streams.

The subsoil is a yellowish brown fine sandy loam or fine micaceous sand to a depth of 36 inches or more. In some of the areas bordering the streams considerable river gravel is found. Both the soil and subsoil contain fine scales of mica.

The Toxaway soils are mellow and easily tilled and on account of their position improved labor-saving machinery can be used advantageously.

AVERAGE CHEMICAL COMPOSITION OF TOXAWAY FINE SANDY LOAM.

		Percentage Composition on the Dry basis.					Pounds of Total Plant Food Constituents per Acre.			
		Volatile matter.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.
Surface	} 2 mm.-----	6.93	.1252	.132	2.60	.873	2505	2640	52000	17500
Subsoil		4.35	.030	.0797	2.607	.845	2400	6380	208600	67600.

AVERAGE MECHANICAL ANALYSIS

	Gravel. Per cent.	Coarse sand. Per cent.	Medium sand. Per cent.	Fine sand. Per cent.	Very fine sand. Per cent.	Silt. Per cent.	Clay. Per cent.
Surface Soil.-----	.50	2.25	2.95	42.20	18.15	22.45	10.70
Subsoil -----	.25	4.05	8.30	29.55	13.65	29.50	15.15

LOCATION OF EXPERIMENTAL FIELDS.

Experimental work is being conducted on four of the more important of these mountain soils and they furnish us data which can be applied to practically all of the section.

This work is located at the following places:

1. The Buncombe Test Farm, about midway between Black Mountain and Swannanoa in Buncombe County. This is one of five test farms owned and operated by the State Department of Agriculture.

2. The Hendersonville field, one mile northeast of the railroad station at Hendersonville, Henderson County, on the farm of B. W. Marshall.

3. The Blantyre field, one-half mile northeast of Blantyre on the farm of Chas. Baldwin. These last two fields are in easy walking distance from the stations of Hendersonville and Blantyre, while the Buncombe Farm can easily be reached from either Black Mountain or Swannanoa, being not over forty-five minutes walk from either.

RESULTS ON THE BLANTYRE FIELD, PORTER'S CLAY.

The Blantyre field is typical Porter's clay, and is representative of much of the heavy upland soils of the mountains. It consists of twelve one-twentieth acre plats. This field was established in the spring of 1910. Corn was grown on all the plats, it being the first crop of the following three-year rotation:

First Year—Corn.

Second Year—Wheat.

Third Year—Red clover.

The following materials were used as carriers of the different elements of plant food:

Dried blood for nitrogen.

Acid phosphate for phosphoric acid.

Potassium sulphate for potash.

Rock lime for lime.

The rate of application is based on the amount of the various plant foods known to be removed by maximum crops. In the case of corn 100 bushels was taken as a maximum yield. This may seem high to some but many such yields are yearly obtained in the State and over twice this amount has been produced on a measured acre. Even on this very much depleted field, we obtained a yield of nearly 60 bushels by the use of commercial fertilizers alone. In order to secure the required amount of plant food it was necessary to apply the following amounts of materials:

Dried Blood—1,062 lbs.

Acid Phosphate—350 lbs.

Sulphate of potash—170 lbs.

Lime was applied at the rate of 1,000 pounds of rock lime per acre.

The following table gives the treatment and the yield of each of the plats:

TABLE 1. RESULTS ON PORTER'S CLAY. CHAS. BALDWIN'S FARM, BLANTYRE, TRANSYLVANIA CO., N. C.

Plat No.	TREATMENT.	Yield per Acre.		Increase.	
		Grain. Bushels.	Stover. Pounds.	Grain. Bushels.	Stover. Pounds.
1	None.....	23.1	1590		
2	Lime (CaO).....	28.4	2030	5.3	440
3	Nitrogen.....	26.7	2020	3.6	430
4	Phosphoric Acid.....	39.0	2200	15.1	860
5	Potash.....	19.7	1180	-4.2	-160
6	None.....	23.9	1340		
7	Nitrogen, Phosphoric Acid.....	55.0	3360	31.1	2020
8	Nitrogen, Potash.....	28.7	2810	4.9	1470
9	Phosphoric Acid, Potash.....	40.1	2130	15.7	780
10	Nitrogen, Phosphoric Acid, Potash.....	52.7	3240	28.3	1870
11	None.....	24.4	1370		
12	Lime, Nitrogen, Phosphoric Acid, Potash.....	59.8	3850	35.4	2480
	Average gain for Nitrogen.....			10.3	1128
	Average gain for Phosphoric Acid.....			22.0	895
	Average gain for Potash.....			-8.5	110
	Average gain for Lime (CaO).....			6.2	525

These results certainly indicate that phosphoric acid is first needed by this soil. Acid phosphate alone gave an increase of over 15 bushels per acre. Nitrogen alone gave an increase of only 3.57 bushels, but when applied in addition to phosphoric acid it gave an increase of 16 bushels, nearly one bushel more than did phosphoric acid over no fertilizer. Potash alone gave a smaller yield than no fertilizer, very little increase when applied in addition to nitrogen or phosphoric acid separately, and a decrease in addition to these together.

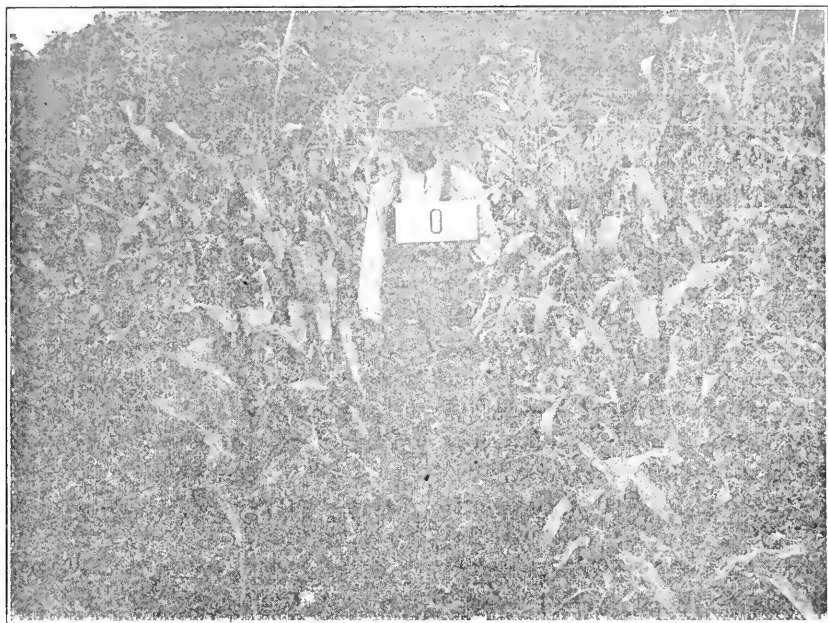


PLATE 2.—Corn Crop on Plat 6, Blantyre Field, 1910. No Fertilizer applied. Yield 23.9 Bushels.

Lime gives very fair increases either alone or in addition to a complete fertilizer, the gain over no fertilizer being at the rate of 5.3 bushels and in addition to all three elements at the rate of 7.1 bushels, making an average increase of 6.2 bushels per acre. This would indicate that lime could be applied at a profit to this soil.

The average gain for each element, given in the lower section of the table, has been computed from the figures in the main table. For example, there are four plats, each one of which received exactly the same treatment as some other plat except that nitrogen was applied in addition. In each case the gain for nitrogen may be determined. Plat number 3 for instance, yielded at the rate of 3.6 bushels per acre more than plat number 1; plat 7 yielded at the rate of 16 bushels



PLATE 3.—Corn Crop on Plat 12, Blantyre Field, 1910. Fertilized with Lime, Nitrogen, Phosphoric Acid and Potash. Yield 59.8 Bushels.

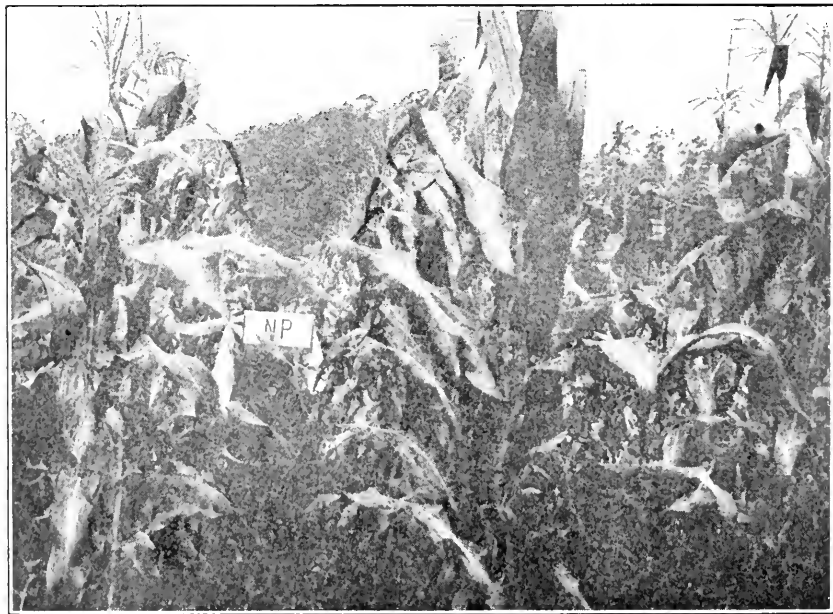


PLATE 4: Corn Crop on Plat 7, Blantyre Field, 1910. Fertilized with Nitrogen and Phosphoric Acid. Yield 55 Bushels.

more than plat 4; plat 8 at the rate of 9 bushels more than plat 5, and plat 10 at the rate of 12.6 bushels more than plat 9. The average of these four is 10.3 bushels as given in the table. The average gain for phosphoric acid, potash and lime is obtained in the same manner.

A glance at these averages shows that phosphoric acid gave over twice the increase in grain that any other element did, but that the increase in stover was less than that produced by nitrogen. The average of the four cases where potash forms the only difference in treatment shows a decrease of nearly 1 bushel of corn per acre and a small gain in stover due to this element.

While it is not safe to draw definite conclusions from one season's work, the marked benefit of phosphoric acid and nitrogen compared to potash certainly justifies the assumption that the phosphoric acid and nitrogen supply must be increased in order to produce large crops permanently. Such an assumption is in accord with the chemical analysis of this soil which shows it to be abnormally high in potash. The surface $6\frac{3}{8}$ inches contains enough of this material for nearly 375 one hundred bushel corn crops, while it is deficient in both phosphoric acid and nitrogen. Twenty-five such crops would require an amount of phosphoric acid equal to the total existing in the top $6\frac{3}{8}$ inches, while half this number would use up all the nitrogen.

RESULTS ON THE HENDERSONVILLE FIELD, PORTER'S SANDY LOAM.

The Hendersonville field is located on typical Porter's sandy loam and is exceptionally uniform throughout. It is adjacent to the public road leading northeast from the town and is not over a twenty-minutes walk from the station. There are eleven plats in this field, the nine fertilized ones receiving the same treatment as the corresponding ones on the Blantyre field. This field, too, was established in the spring of 1910, and corn grown the first year. The same three-year rotation of corn, wheat and red clover will be followed on this farm.

The following table gives the treatment and yields of corn in 1910:

TABLE 2. RESULTS ON PORTER'S SANDY LOAM. B. W. MARSHALL'S FARM, HENDERSONVILLE, HENDERSON CO., N. C.

Plot No.	TREATMENT.	Yield per Acre.		Increase.	
		Grain. Bushels.	Stover. Pounds.	Grain. Bushels.	Stover. Pounds.
1	None.....	22.6	1680	-----	-----
2	Lime (CaO).....	35.7	2400	13.1	720
3	Nitrogen.....	39.1	3160	16.5	1480
4	Phosphoric Acid.....	20.6	1680	-2.0	0
5	Potash.....	20.6	1760	-2.3	240
6	Nitrogen, Phosphoric Acid.....	53.7	2840	30.8	1320
7	Nitrogen, Potash.....	37.1	2400	14.2	880
8	None.....	22.9	1520	-----	-----
9	Phosphoric Acid, Potash.....	27.3	2280	4.4	760
10	Nitrogen, Phosphoric Acid, Potash.....	64.3	3840	41.4	2320
11	Lime, Nitrogen, Phosphoric Acid, Potash.....	70.3	3920	47.4	2400
	Average gain for Nitrogen.....			25.8	1210
	Average gain for Phosphoric Acid.....			11.6	410
	Average gain for Potash.....			3.3	270
	Average gain for Lime, (CaO).....			9.6	400

There is a striking difference in the results on this field compared with those on the Blantyre field. Here we find no apparent benefit from phosphoric acid alone but nitrogen alone gave an increase of 16.5 bushels. When acid phosphate was applied in addition to nitrogen we find it gave a large increase. Like the Porter's clay of the Blantyre field, this soil responds to both nitrogen and phosphoric acid when applied together, but instead of phosphoric acid being needed first, nitrogen appears to be the controlling element in crop production. This is brought out very clearly in the lower section of the table. Here we find, as at Blantyre, that nitrogen and phosphoric acid gave the largest increases, but that their relative importance is practically reversed. Potash either alone or in addition to nitrogen gave slight decreases in yield, but in the case of plats 9 and 10 where applied with phosphoric acid, and with nitrogen and phosphoric acid, the yields were larger than on plats 4 and 6. The increase of number 10 over number 6 is very marked, so much so that it brings up the average gain for potash to 3.3 bushels per acre as compared to a loss of .85 bushels on the Porter's clay.

Lime alone gave an increase of 13.14 bushels and in combination with nitrogen, phosphoric acid and potash, 6 bushels. This large

increase from lime alone is probably mainly due to the liberating of the plant food supply of the soil, especially of the nitrogen in this case, and it certainly will be of interest to see how long this soil will



PLATE 5.—Corn Crop on Plats 6, 7 and 8, Hendersonville Field, 1910.
53.7, 37.1 and 22.9 Bushels Respectively.

continue to produce as much as 35.7 bushels under this exhaustive treatment.

RESULTS ON THE BUNCOMBE TEST FARM.

The Buncombe Farm, which contains some 300 acres, is owned and operated by the State Department of Agriculture. It includes a large section of the Swannanoa valley land, which is very typical Toxaway loam, and considerable tillable upland which is representative of the Porter's loam. Fertilizer results on this farm should be applicable to extensive areas in practically all of the mountain counties of the State. Both of the types on this farm correspond very closely with the descriptions previously given in this bulletin. The Buncombe Test Farm was purchased by the State in 1908. Mr. R. W. Collett has had supervision of this farm since it came into possession of the State, and the accuracy of the results herein reported is due largely to the careful attention he has given the field work.

TOXAWAY LOAM.

Field "A" was established in 1908, but the 1909 crop on most of the plats was destroyed by excessive floods, so only 2 years' yields are given. The soil is typical Toxaway loam. This field consists of one series of 18 plats, which originally were one-fifteenth acre in size, but due to the lack of uniformity, it was found advisable to cut these plats down to one twentieth acre. This field has been in corn each

of these three years. No catch crop was grown the first two years. Crimson clover was sown in the corn in the fall of 1910 and will be

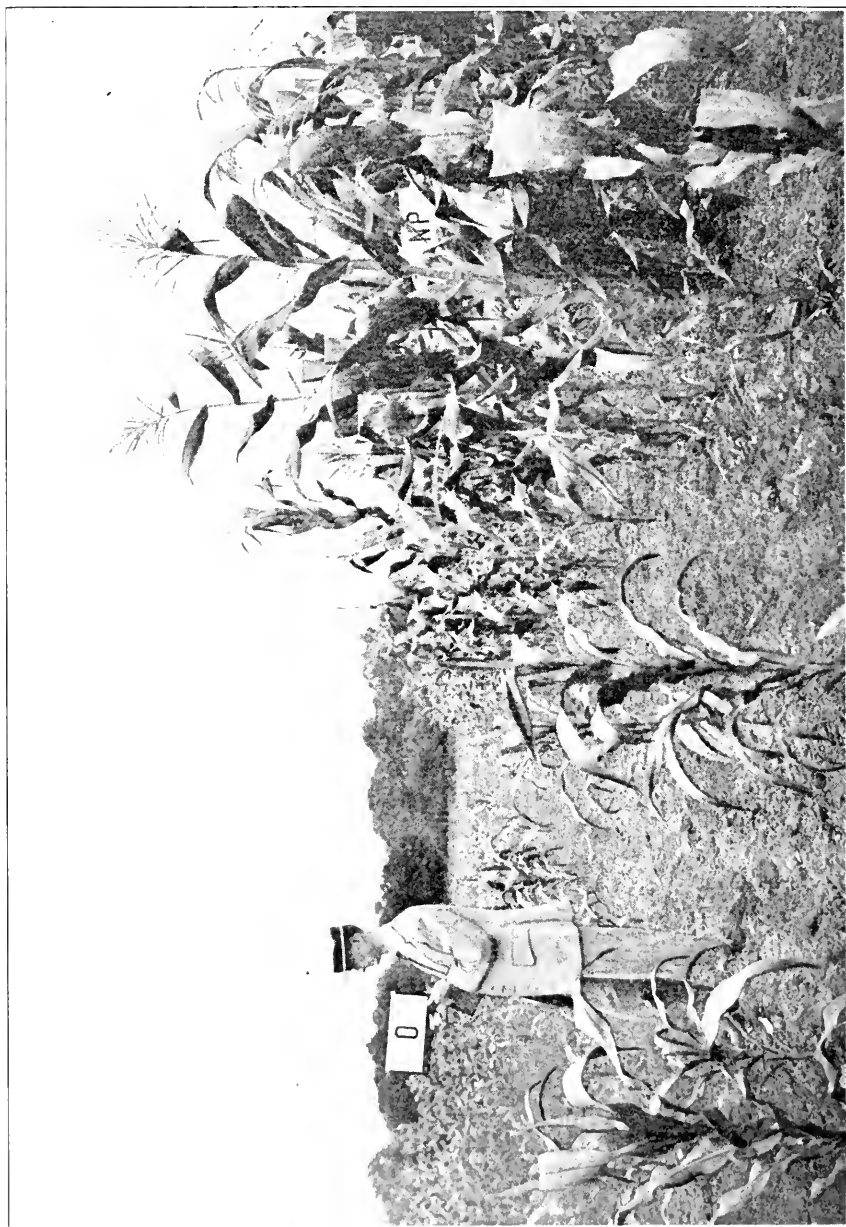


PLATE 6.—Corn Crop on Plats 3 and 4, Field A, Buncombe Test Farm, 1910. Phosphoric Acid and Potash on Right. No Fertilizer on Left. Yields 33 and 11 Bushels Respectively. (NP on placard should be PK.)

turned under in the spring of 1911. A three-years rotation of corn, wheat and red clover will be followed on this field in the future.

In table 3 are given the results on part of this field. The others are recorded in table 6. This table is discussed under the heading of Commercial Fertilizers, since the treatment on this field was previously planned to furnish information relative to the most profitable formula to use on this soil for corn. However, we are able to draw some conclusion as to the needs of this soil as a type, and the effects on it of the individual elements. The first three plats unfortunately are on land which is of a very different character than the remainder of the field, and for this reason the results derived on them are of less value. They include considerable areas of a dark phase of the Toxaway loam which is very unproductive. In fact, in 1910, the corn all died on plat 2, though the greater part of it germinated and made some growth.

The same carriers of plant food were used as sources of nitrogen, phosphoric acid and lime as previously stated, but the potash was obtained from manure salt instead of sulphate of potash. The rate of application was on the arbitrary basis of a 7-2½-1½ mixture. Three hundred pounds of this was the amount applied to the normal plat in 1908 and 400 pounds in 1910. This would give 21 pounds of phosphoric acid, 7½ pounds of nitrogen and 4½ pounds of potash per acre in 1908, and 28, 10 and 6 pounds, respectively, in 1910.

TABLE 3. RESULTS ON FIELD A, BUNCOMBE FARM, 1908 AND 1910.

Plat No.	Treatment.	Yield per Acre.						Average Increase.		Value of Increase.	Cost of Fertilizer.	Profit.
		Grain, bushels.			Stover, pounds.			Grain.	Stover.			
		1908	1910	Avr.	1908	1910	Avr.					
1	NP.....	22.7	18.7	20.7	1395	1100	1248	14.2	398	\$11.53	\$3.66	\$7.87
2	NK.....	5.2	0	2.6	533	0	267	-3.9	-584	-5.07	2.70	-7.77
3	PK.....	33.0	21.1	27.1	2565	1360	1963	20.6	1113	18.87	1.50	17.37
4	None.....	11.0	2.0	6.5	1170	530	850	-----	-----	-----	-----	-----
5	NPK.....	37.2	28.5	32.9	2700	1580	2140	26.4	1290	23.64	3.93	19.71
13	None.....	14.5	3.7	9.1	1710	410	1060	-----	-----	-----	-----	-----
18	Lime.....	33.1	13.7	23.4	1725	800	1263	14.3	203	10.82	2.50	8.32
19	Lime, NPK.....	41.0	36.8	38.9	3289	1780	2535	29.8	1475	26.76	6.43	20.33
17	Manure, P.....	39.3	28.7	34.0	3000	1460	2230	24.9	1170	22.11	2.79	19.32
Gain for N		4.2	7.4	5.8	135	220	177	-----	-----	\$4.77	\$2.43	\$2.34
Gain for P		32.0	28.5	30.3	2160	1580	1870	-----	-----	28.69	1.23	27.46
Gain for K		14.5	9.8	12.2	1305	480	893	-----	-----	11.97	.27	11.70
Average Gain for Lime		11.2	9.5	10.4	302	295	299	-----	-----	8.48	2.50	5.98

It is evident that there were larger increases wherever phosphoric acid was used. In the lower part of the table the amount of increase was obtained by deducting the yield on plat 2, which received nitrogen and potash, from that on plat 5 which received a complete fertilizer. Thus, on account of the soil of plat 2 being of different character the application of phosphoric acid alone would very probably not have shown nearly so great an increase as this table indicates. Likewise, the yield of 12.2 bushels per acre, which is the indicated increase from potash, is too great since it represents the difference between the yield on plat 1 and on plat 5. The same discrepancy arises in the increase of 5.8 bushels due to nitrogen. However, these figures represent the relative importance of the three elements when applied to this dark phase of Toxaway loam.

Lime was applied alone and in combination with nitrogen, phosphoric acid and potash. In both cases it gave material increases in yield as shown by the results on plats 18 and 19. It is of interest to note in this connection that the yield on plat 18 which received lime alone dropped from 33.1 bushels in 1908 to 13.7 bushels in 1910. This decrease is not proportionately as great as in the case of the unfertilized plats, but it is much more so than on any of the plats receiving phosphoric acid. It is very probable that this temporary beneficial effect of lime alone in 1908 was due to the liberation of the plant food supply in the soil.

TABLE 4. ONE YEAR'S RESULTS WITH OATS, BUNCOMBE FARM.

Plat No.	TREATMENT.	Bushels per Acre.
5	O.....	2.5
6	N.....	3.3
7	P.....	14.7
8	K.....	4.2
2	NP.....	17.7
3	NK.....	2.8
4	PK.....	15.3
1	NPK.....	19.2
Average gain for N.....		1.6
Average gain for P.....		13.1
Average gain for K.....		.8

Table 4 gives the results obtained by Mr. Collett with oats on Toxaway loam. This experiment was put out on temporary plats and not continued. The application of the various elements was at the rate of 400 pounds of an 8-2-2 fertilizer. Results of tests of single elements applied alone, show differences in their relative values

that are very striking. Even after making due allowances for the heavier application of phosphoric acid, the large average gain of 13.1 bushels per acre for this element as compared with 1.6 for nitrogen and .8 for potash certainly confirms the conclusion that phosphoric acid is the controlling constituent of plant food for the Toxaway loam. The relative yield of oats on these plats is illustrated on the cover of this bulletin.

PORTER'S LOAM.

Field "B" is located on representative Porter's loam. It consists of 19 plats, with the same plan of treatment as field "A" on the Toxaway loam. The same materials were used and the relative applications for the plats have been the same. However, the normal application was at the rate of 300 pounds per acre for both years.

The plats included in table 5 correspond to those of field "A" in table 3.

TABLE 5. RESULTS ON FIELD B, BUNCOMBE FARM, 1908 AND 1909.

Plat No.	Treatment.	Yield per Acre.						Average Increase.		Value of Increase.	Cost of Fertilizer.	Profit.
		Grain, bushels.			Stover, pounds.			Grain.	Stover.			
		1908	1909	Avr.	1908	1909	Avr.					
1	NP.....	30.3	20.0	25.2	4470	1335	2903	.2	911	\$ 3.78	\$3.13	\$.65
2	NK.....	18.6	13.9	16.3	3390	1058	2224	—8.7	232	—5.16	2.31	—7.47
3	PK.....	34.8	16.7	25.8	2903	930	1917	.8	—75	.26	1.28	—1.02
4	None.....	33.2	16.8	25.0	2850	1133	1992					
5	NPK.....	41.2	17.6	29.4	3608	1110	2359	4.4	367	4.55	3.36	1.19
13	None.....	30.1	18.0	24.1	2685	1140	1913					
18	Lime.....	35.6	16.2	25.9	2993	983	1988	1.8	75	1.56	.63	.93
19	Lime, NPK.....	46.0	21.0	33.5	3315	1230	2273	9.4	360	8.02	4.62	3.40
17	Manure, P.....	47.4	23.7	35.6	3420	1073	2247	11.5	334	9.39	2.59	6.80
Grain for N.....		6.4	.9	3.7	705	180	442			4.36	2.08	2.28
Grain for P.....		22.6	3.7	13.1	218	52	135			9.71	1.05	8.66
Gain for K.....		10.9	—2.4	4.2	—862	—225	—544			.76	.23	.53
Average gain for Lime.....		5.2	.8	3.0	8	—19	—6			2.08	1.26	.82

We find that phosphoric acid again gives us the largest increase in grain, but the average gain is greater for nitrogen. There is little difference in the average gain in grain for nitrogen, potash or lime. However, though the nitrogen is credited with a gain of 442 pounds of stover per acre, both potash and lime failed to increase the stover over no fertilizer.

It is impossible to draw absolute conclusions as to the requirements of this type from data thus far obtained. Nevertheless, as in the case of the Toxaway loam, it is safe to say that in the permanent building up of the type both the phosphoric acid and nitrogen content must be increased. Also, little if any potash need be used if the ground is given thorough tillage, and a rotation used which is adapted to the maintenance of the type.

COMMERCIAL FERTILIZERS.

In the Mountain section commercial fertilizers are not as extensively used in general farming as they are in the eastern part of the State. The extensive growing of cotton and tobacco has made possible the profitable use of ready-mixed fertilizers in the east. There is not the possibility of profit from this class of goods in grain farming, so we can hardly expect anywhere near the development of the fertilizer industry in this section as in the east. The abundance of potash in most of the types, and the small amount of profit possible from using commercial nitrogen on grain, practically limit the fertilizer constituents to phosphoric acid.

The plat work on fields "A" and "B" at the Buncombe Farm were planned as mentioned before, to determine the formula which would prove the most profitable for corn on the Toxaway and Porter's loams. The results on the Toxaway loam (field "A"), are given in tables 3 and 6, while those on the Porter's loam (field "C"), are in tables 5 and 7.

The following fertilizing materials were used on these plats: Dried blood for nitrogen, acid phosphate for phosphoric acid, manure salt for potash, and lime from air slaked lime. The normal application of these materials was at the following rate:*

69.2 lbs. of 13 per cent blood=9 lbs. nitrogen per acre.

150 lbs. of 14 per cent acid phos.=21 lbs. phos. acid per acre.

22.5 lbs. of 20 per cent manure salt=4.5 lbs. potash per acre.

Lime at the rate of 500 lbs. of rock lime or 1,000 lbs. air slaked lime.

This application exclusive of lime, gives the formula 7-3-1½.

The following prices have been used in figuring the cost, and the value of crops:

14 per cent acid phos., \$14.00 per ton.

13 per cent blood, \$60.00 per ton.

20 per cent manure salt, \$20.00 per ton.

Rock lime, \$10.00 per ton.

Corn, 70 cents per bushel.

Corn stover, \$8.00 per ton.

*The normal application was increased on field "A" in 1910 from 300 to 400 pounds per acre. This would increase by one-third the amounts of all materials given above.

TABLE 6. RESULTS ON FIELD A, BUNCOMBE FARM, 1908 AND 1910.

Plat No.	Treatment.	Yield per Acre.						Average Increase.		Value of Increase.	Cost of Fertil- izer.	Profit.
		Grain, bushels.			Stover, pounds.			Grain.	Stover.			
		1908	1910	Avr.	1908	1910	Avr.					
4	None.....	11.0	2.0	6.5	1170	530	850	-----	-----	\$	\$	\$
6	N ½ PK.....	38.0	30.7	34.4	2828	1580	2204	27.9	1354	24.95	2.72	22.23
7	N 2 PK.....	31.1	29.4	30.3	3060	1500	2280	23.8	1430	22.38	6.36	16.02
4	None.....	11.0	2.0	6.5	1170	530	850	-----	-----	-----	-----	-----
8	NP ½ K.....	27.9	18.2	23.1	2610	1120	1865	16.6	1015	15.68	3.31	12.37
13	None.....	14.5	3.7	9.1	1710	410	1060	-----	-----	-----	-----	-----
10	NP 2 K.....	43.0	41.1	42.1	3045	1950	2498	33.0	1438	28.85	5.16	23.69
13	None.....	14.5	3.7	9.1	1710	410	1060	-----	-----	-----	-----	-----
11	NPK ½.....	37.8	28.4	33.1	3218	1370	2294	24.0	1234	21.74	3.79	17.95
12	NPK 2.....	39.2	28.2	33.7	3068	1560	2314	24.6	1254	22.24	4.20	18.04
13	None.....	14.5	3.7	9.1	1710	410	1060	-----	-----	-----	-----	-----
14	½ (NPK).....	27.9	21.8	24.9	2535	1320	1928	15.8	868	14.53	1.97	12.56
15	1½ (NPK).....	43.0	35.2	39.1	3180	1640	2410	30.0	1350	26.40	5.90	20.50
16	2 (NPK).....	47.6	41.0	44.3	3358	1830	2594	35.2	1534	30.78	7.86	22.92

The figures in tables 3 and 6 for field "A" show a profit from the use of fertilizer in every case but one. This one loss is on plat 2, the only plat except the lime plat, number 18, which did not receive phosphoric acid as a fertilizer. A careful comparison of the items in the profit column indicates that practically all the profit is from phosphoric acid.

In table 6 we find that the twice normal application of nitrogen on plat 7 gave less profit than one-half normal, plat 6; that the twice normal application of potash, plat 12, gave only 9 cents more profit than the one-half normal application on plat 11; but that the twice normal application of phosphoric acid on plat 10 gave nearly twice the profit that the one-half normal, plat 8, did. Too, when the application of phosphoric acid was cut down to one-half normal, plat 8, the profit was reduced far below that given by plats 6 and 11 in which nitrogen and potash respectively were applied in half normal amounts. Furthermore, the profit on plat 16, which received twice normal was less than on plat 10, receiving normal amounts of nitrogen and potash, and twice normal amounts of phosphoric acid.

TABLE 7. RESULTS ON FIELD B, BUNCOMBE FARM, 1908 AND 1909.

Plat No.	Treatment.	Yield per Acre.						Average Increase.		Value of Increase.	Cost of Fertilizer.	Profit.
		Grain, bushels.			Stover, pounds.			Grain.	Stover.			
		1908	1909	Avr.	1908	1909	Avr.					
4	None.....	32.2	16.8	25.0	2850	1133	1992			\$.....	\$.....	\$.....
6	N 1½ PK.....	45.0	21.7	33.4	3525	1230	2378	8.4	386	7.42	2.32	5.10
9	None.....	30.5	16.5	23.5	2640	1088	1864					
7	N 2 PK.....	51.3	21.9	36.6	2873	1245	2059	13.1	195	9.95	5.44	4.51
9	None.....	30.5	16.5	23.5	2640	1088	1864					
8	NP 1½ K.....	38.0	16.8	27.4	3263	1058	2161	3.9	297	3.92	2.84	1.0
10	NP 2 K.....	47.9	23.2	35.6	3480	1125	2303	12.1	439	10.23	4.41	5.82
13	None.....	30.1	18.0	24.1	2685	1140	1913					
11	NPK 1½.....	45.0	23.5	34.3	3525	1268	2397	10.2	484	9.18	3.25	5.93
12	NPK 2.....	47.0	25.5	36.3	3495	1455	2475	12.2	562	10.80	3.59	6.21
13	None.....	30.1	18.0	24.1	2685	1140	1913					
14	1½ (NPK).....	39.2	24.3	31.8	3390	1388	2389	7.7	476	7.29	1.68	5.61
15	1½ (NPK).....	51.4	27.0	39.2	3758	1373	2566	15.1	633	13.18	5.04	8.14
16	2 (NPK).....	54.2	26.6	40.4	3945	1515	2730	16.3	817	14.68	6.72	7.96

By a comparison of plats in table 7 it will be seen that on Porter's loam, phosphoric acid is the only material giving a decided profit on corn. Throughout this table the profit from commercial fertilizer on Porter's loam is decidedly less than on Toxaway loam; but in both cases phosphoric acid was the only constituent which gave any decided profit.

PHOSPHORIC ACID.

The results which are given in this bulletin show conclusively that phosphoric acid is required by both the upland and valley soils of the mountains. Wherever it has been applied the yields have been increased. The chemical analyses show that the total supply in any of the types which are farmed extensively is below that commonly required for the production of maximum crops, and that 20 to 30 large grain crops would require as much of this element as is contained in the surface 6 $\frac{3}{4}$ inches of most of the types.

There are several sources from which phosphoric acid is commonly obtained as a fertilizer. These are acid phosphate, bone meal, basic slag, and ground phosphate rock or floats. Floats is the name given to ground phosphate rock; acid phosphate is the same

material treated with an equal amount of sulphuric acid; basic slag is a by-product of the manufacture of steel from phosphatic iron ore, and bone meal is a by-product of slaughter houses.

Of these acid phosphate is the most extensively used in this State as it is the more common carrier of phosphoric acid in our mixed fertilizers. It is readily available and consequently acts quickly. Bone meal either raw or steamed is very desirable, but is a more expensive carrier of phosphoric acid than the others. Basic slag is a desirable form since it contains lime as well as phosphate and consequently assists in correcting any possible acidity. Phosphoric acid in this form, however, is not as available as in acid phosphate. The ground rock or floats undoubtedly furnishes the cheapest source of phosphoric acid to be used in the permanent improvement of the soils of this section. Phosphoric acid can be secured in this material at about one-fourth of what it would cost in acid phosphate and one-third as much as in slag. It is not readily available, but when applied in combination with stable manure or turned under with a green crop, it has considerable effect the first year.

An experiment was put out in 1910 on the Toxaway loam of the Buncombe Farm to determine the relative value of rock and acid phosphate, when applied alone, in combination with stable manure and when turned under with a green crop. This is known as field "D" and consists of eight one-twentieth acre plats.

TABLE 8. RESULTS ON FIELD D, BUNCOMBE TEST FARM, 1910.

Plat No.	TREATMENT.	Yield per Acre in 1910.		Increase.	
		Grain. Bushels.	Stover. Pounds.	Grain.	Stover.
1	Blood, Acid Phosphate, Manure Salt.....	52.0	3650	15.2	1520
2	Blood, Rock Phosphate, Manure Salt.....	42.5	2910	5.7	780
3	None.....	36.8	2130		
4	Acid Phosphate, Stable Manure.....	57.7	2950	20.5	820
5	Rock Phosphate, Stable Manure.....	57.4	3220	24.6	1400
6	None.....	32.8	1820		
7	Acid Phosphate, Manure Salt.....	40.4	2330	7.6	510
8	Rock Phosphate, Manure Salt.....	35.5	2120	2.7	300

The treatments and yields are given in table 8. Plat 1 of this field received an application of blood, acid phosphate and sulphate of potash at the rate that nitrogen, phosphoric acid, and potash are removed by a one-hundred bushel corn crop. Plat 2 received the same treatment except that rock phosphate was used instead of acid phosphate. Rock was always applied about twice as heavy as acid since it costs approximately one-half as much per ton. The gain from

the acid phosphate was nearly ten bushels more per acre than from the rock. However, in the case of plats 4 and 5 the yield from rock and manure and from acid phosphate and manure were prac-



PLATE 7.—Corn Crop on Plat 4, Field D, Buncombe Test Farm, 1910. Fertilized with Acid Phosphate and Stable Manure. Yield 57.7 Bushels.

tically the same. The gain was greater for the rock and manure as its check plat 6 yielded less than plat 3 which is the check for the acid phosphate and manure plat. In the case of plats 7 and 8 the acid phosphate gave a larger yield than the ground rock. This is

to be expected, as there was no green crop to turn under the first year. No nitrogen was applied in commercial form as the plan is to try to secure the nitrogen wholly through the growing of legume crops, and



PLATE 8.—Corn Crop on Plat 5, Field D, Buncombe Test Farm, 1910. Fertilized with Rock Phosphate and Stable Manure. Yield 57.4 Bushels.

then apply the phosphate just before a green crop is turned under. The results from this field will become much more valuable as the years go by.

Nevertheless, the fact that rock phosphate when mixed with manure gave as large yields as did the acid phosphate and manure when applied in amounts of equal valuation, is of great importance.

In the use of the rock, not only is the yield being increased as rapidly, but the soil is being enriched in phosphoric acid four times as fast. The practice of mixing rock phosphate with manure as it accumulates in the stable is certainly commendable. We advise the addition of 75 to 100 pounds to each ton of manure for the soils of this section. Another method of using the rock phosphate is to apply it to clover sod or a green catch crop. In this case we would recommend an application of 800 to 1,000 pounds per acre every three or four years.

NITROGEN.

Most of our tilled mountain soils are deficient in organic matter, and therefore lack nitrogen, as organic matter is the principal source of nitrogen in the soil. This source of supply is not sufficient as is shown by the plat results. Other than organic matter there are three sources from which to obtain nitrogen: commercial fertilizers, farm manure, and the free nitrogen of the air.

There are many nitrogenous materials used as fertilizers, but they are all expensive. Especially is this true for the mountains, since the general farm crops are heavy feeders on nitrogen. In the eastern part of the State where cotton is the leading crop commercial carriers of nitrogen can be used with profit. Where grain and grasses are grown chiefly, however, other sources must be depended upon. Stable manure furnishes one of the most desirable sources, as there are large amounts of organic matter in it as well as nitrogen, and at the same time considerable quantities of phosphoric acid and potash. Still, it is not a well-balanced fertilizer for these soils unless fortified with additional phosphoric acid. Valuable as it is, however, the supply of organic matter and nitrogen in the soils throughout this section can not be built up through the use of manure alone, because in the production and handling of manure there is a great loss of the element nitrogen.

The only other available source is that contained in the air. Here we find the supply which must be largely depended upon in the permanent increase of the supply of this element in the soils of the Mountain section. Most crops, including the grains and grasses, are unable to draw upon the inexhaustible supply, but there is a large class known as legumes which have this power. The clovers, peas and beans, as is commonly known, are legumes. They furnish an economical means of maintaining and even upbuilding the supply of this most expensive element of plant food in our soils. It has truthfully been said of them that "They not only feed themselves, but pay for the privilege," meaning that they not only secure nitrogen for their own growth but at the same time furnish a profitable crop.

POTASH.

The mountain types so far studied, without exception, contain an abundance of potash in the surface soil for the production of maximum crops for several hundred years. It is more a problem of making this supply available than of increasing it. Not only do the chemical analyses show that there is an abundance of potash in these soils,* but in no case do we find any marked increase in yield due to its use, and frequently the yield is actually reduced. It certainly would give better immediate returns and would be far more beneficial to eliminate potash altogether for general farm crops, and put the money into an additional supply of phosphoric acid. Potash, however, can be applied with profit to tobacco and very probably to Irish potatoes.

LIME.

The plat results already obtained on both upland and valley land indicate that burned lime can be used at a profit for temporary gains. These soils are not strongly acid, neither are they lacking in lime; therefore, the beneficial results obtained from the use of lime must be due, not to the correction of acidity, or to the effect of lime as a plant food, but rather to the liberation by the burned lime of the plant food already in the soil. This process of the liberating of plant food by burned lime is destructive, as it reduces the amount of plant food in the soil. This effect, though justifiable so far as potash is concerned, on these soils so low in phosphoric acid and nitrogen, is certainly not to be desired. Furthermore, in liberating nitrogen organic matter is destroyed, and much of the nitrogen in it may be lost. Unburned lime, calcium carbonate, does not have these destructive effects. Therefore it would seem that the unburned lime is preferable in the case of the mountain soils, with the possible exception of the Porter's black loam or other soils containing high amounts of organic matter and phosphoric acid. On these burned lime may prove more profitable.

CROP ROTATIONS AND PERMANENT AGRICULTURE.

It is the duty of every owner of agricultural land in this or any other section of the State to follow methods of crop rotation and fertilization which shall maintain the producing power of the fertile soils, and which shall build up that of the poorer ones. Our methods of farming should be such that the soils would become more productive year by year. The one great purpose in the present investigation of North Carolina soils as outlined in the beginning of this

* In some cases the composition is as high as 5% which is nearly half as much as is contained in kainit. It would require in this case something like 400 tons of kainit to supply as much potash as is contained in the top 6-2-3 inches of an acre.

report, is to determine the most economical methods of fertilizing the various soil types, which, when applied in conjunction with proper crop rotations, will increase the producing power and thereby establish a better system of agriculture.

We have experimental work in progress in the Mountain section which has this end primarily in view, but it will require a period of several years before very definite results can be expected from it. However, we are able at this time to recommend methods which if followed on the Porter's and Toxaway soils will come nearer maintaining their productivity than the methods more commonly now in practice.

Such a system of management must first of all include the application of phosphoric acid. In addition, it must include either the use of large quantities of farm manure, or the turning under of leguminous crops. The organic matter in the case of the great part of the cultivated soils of the mountains must be increased before maximum grain crops can be produced at a profit. With this purpose in view the following rotations are recommended.

THREE-YEARS ROTATION.

First Year—Corn, with soja beans drilled in row at planting or before first cultivation.

Second Year—Wheat, red clover.

Third Year—Red clover.

This is a short rotation admirably adapted to the grain farms of the section. The corn stover and wheat straw should be plowed under or fed to stock and the manure carefully saved and returned to the soil. The soja beans should be turned under and likewise the last crop of red clover.

In starting this rotation we would recommend an application of 200 to 400 pounds of acid phosphate or steamed bone meal under the corn and 100 pounds of nitrate of soda used as a top dressing. If available, farm manure may be used with the phosphate and the nitrate eliminated. This fertilization applies to the more extensively tilled types. The nitrogen application could well be reduced or left off entirely on new land or on the darker phases or types. Unless lime has been applied within the last two or three years, an application of 1,000 pounds of ground limestone should be added to the lighter colored soils and 500 pounds of burned lime to those containing large amounts of organic matter, this lime to be applied broadcast and thoroughly incorporated with the surface soil at the time of preparing the land for corn or wheat crop.

The first year wheat is grown it should receive similar treatment to that recommended for corn. In addition to the acid phosphate it

would be well to apply 200 to 400 pounds of basic slag or rock phosphate per acre, as this fertilization is for both the wheat and clover crops.

An application of 1,000 pounds of rock phosphate to the crop of clover before it is turned under in the fall should furnish sufficient phosphoric acid for the crops of the second period of this rotation. Within a comparatively short time enough nitrogen should be fur-



PLATE 9.—Soja Beans Growing in Rows with Corn, 1910.

nished by the soja beans, the clover, and the roughage, or stable manure if crops are fed, that the nitrate could be largely if not entirely dispensed with. The application of rock phosphate and lime should be made every three years. Livestock farming in connection with this rotation would materially help in improving the productivity of these soils.

FOUR-YEAR ROTATIONS.

A good four-year rotation is the same as the above with oats and soja beans following corn the second year.

Another four-year rotation which could be adopted in this section is:

First Year—Corn.

Second Year—Crimson clover and soja beans.

Third Year—Wheat, red clover.

Fourth Year—Red clover.

A similar method of fertilization should be adopted with these four-year rotations as is given for the three-year rotation.

FIVE- OR SIX-YEAR ROTATION.

Any of these rotations with two years of pasture added would make them even better adapted to livestock farming. However, it is improbable that this would often prove desirable in the Mountain section, since there is usually sufficient land for pasture which is too rolling for cultivation, making it necessary to keep the tillable land continually under cultivation.

CORN AND CRIMSON CLOVER.

A good and practical method of soil improvement and the production, at the same time, of profitable corn crops, is to grow a crop of corn and crimson clover each year, using good fertilization on the corn crop at first. Crimson clover is sown in corn at the last cultivation and turned under the latter part of April or early in May in time to plant corn. A crop of crimson clover is obtained in this way each year and very little difficulty is found in getting a stand of crimson clover in the corn. The productiveness of the land can be rapidly increased with this cropping provided sufficient amounts of phosphoric acid be applied.

SOIL ANALYSES.

Eleven years ago work was begun in mapping the soils of the State. These maps, which are being made of the various counties, show the location and extent of the different soil types. Between 25 and 30 per cent of the area of the State has been worked from which a large number of soil samples have been collected and analyzed. These analyses are brought together on the following pages. They have been used in connection with this report and these and other analyses will be used in our further investigations of the soils and crops of the State. The analyses show all the mountain soils to be very high in potash, low in phosphoric acid and to contain a fair percentage of lime; the amount of nitrogen is variable, and depends on the amount of organic matter in the soil. The field experiments which have been made on these soils and presented, in part, in this report, show that potash is not needed for the production of good crops, but that phosphoric acid is the most important constituent.

The soil analyses and the experiments point the way to the proper use of fertilizers for the production of profitable crops in the Mountain section, as well as the kind of fertilization and rotations to be followed for the permanent improvement of the soils. Phosphates in some form must be used liberally, nitrogen must be supplied either in fertilizers or by growing soil-improving crops, while potash is not needed.

A study of these analyses will prove interesting and profitable. They are fundamentally important in connection with a more profitable and progressive agriculture for the Mountain section.

COMPOSITION OF PORTER'S SANDY LOAM.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percentage of Fine Earth, mm.	Percentage Composition of Fine Soil on Dry Basis.					Pounds of Total Plant Food Constituents per Acre.			
					Volu- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash.	lime, CaO.	Nitrogen.	Phosphoric acid.	Potash.	lime, CaO.
Average of all the analyses of the type ----			{ Surface..... Subsoil.....	{ 95.86 99.05	6.23 6.32	.0799 .0286	.0599 .0628	3.40 3.01	.734 .706	2594 2276	1152 4980	64853 265832	14188 55794
0-15 15-36	{ 639 640	{ 6 miles south of Brevard.....	Transylvania.....	{ 87.3 100	6.30 9.41	.08 .02	.10 .097	4.00 1.70	.31 .11	1397 1600	1746 7760	69840 136000	5413 8800
0-8 8-36	{ 645 646	{ 4 miles n.w. of Lake Toxaway	Transylvania.....	{ 97.1 97.4	9.06 4.42	.16 .03	.108 .09	1.55 1.67	.75 1.90	3107 2238	2097 7013	30101 130126	14565 148048
0-15 15-30	{ 648 649	{ 3 miles s. w. of Lake Toxaway	Transylvania.....	{ 100 100	3.52 7.57	.03 .03	.05 .065	4.26 3.12	.22 .11	600 2400	1000 5200	85200 249600	4400 8800
0-7 7-24	{ 652 653	{ Lake Toxaway.....	Transylvania.....	{ 90 98	6.91 4.91	.09 .03	.06 .046	3.77 4.64	1.00 .87	1620 2352	1680 3606	67800 343776	18000 68208
0-8 8-36	{ 660 661	{ Rainey Knob.....	Transylvania.....	{ 100 100	10.38 7.39	.12 .03	.11 .08	1.63 1.15	1.39 1.23	2400 2400	2200 6400	32600 92000	27800 98400
0-7 7-36	{ 692 693	{ 4 miles s. w. of Brevard.....	Transylvania.....	{ 96.7 96.7	5.01 3.84	.03 .002	.058 .04	4.11 4.47	.47 .38	580 155	1122 3094	79487 345799	9090 20397
0-8 8-36	{ 800 801	{ 4½ m. s. w. of Hendersonville	Henderson.....	{ 93.74 100	4.43 11.04	.036 .032	.03 .049	4.04 2.74	.35 .34	675 2560	562 3920	75742 219200	6562 27200
0-12 12-36	{ 806 807	{ Ginseng farm.....	Henderson.....	{ 98.43 100	8.28 6.79	.123 .063	.01 .082	2.82 2.72	.81 .82	2421 5040	197 6560	55436 217600	15946 65600

COMPOSITION OF PORTER'S SANDY LOAM.—Continued.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth < .002 mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Acre.				
					Vola- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash.	Lime, CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime, CaO.
0-8	817	} 4½ m. s. e. of Zirconia.....	Henderson.....	95.36	4.42	.05	.053	4.24	.75	9536	1111	80865	14304
8-36	818			98.42	3.82	.006	.056	4.58	.41	472	4409	360217	32282
0-10	407	} 2 miles s. w. of Fruitland.....	Henderson.....	100	4.01	.08	.02	3.57	1.29	1600	400	71400	25800
10-30	408			100	4.00	.043	.023	3.30	.89	3440	1840	264000	71200
Average of analyses from Transylvania Co.		{ Surface.....	{ Subsoil.....	95.18	6.86	.085	.081	3.22	.69	1617	1541	60848	13211
				98.68	6.26	.024	.070	2.79	.77	1894	5512	216217	60276
Average of analysis from Henderson Co. ...		{ Surface.....	{ Subsoil.....	96.88	5.28	.072	.028	3.67	.80	3558	568	70861	15653
				99.60	6.41	.036	.053	3.34	.62	2878	4182	265254	49071

COMPOSITION OF PORTER'S SANDY LOAM.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth, mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Surface, 6½ inches. Acre.				2,000,000 lbs.	
					Vola- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash.	Lime, CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime, CaO.	8,000,000 lbs.
Average of		all the analyses of the type.....	{ Surface.....	67.73	5.32	.0514	.044	2.768	1.983	668	574	37413	27366	
			{ Subsoil.....	66.51	4.72	.0272	.0596	2.546	1.871	1441	3101	135071	96677	
0-8	307	{ 3 miles north of Partee.....	Alexander.....	70.97	4.64	.028	.081	2.004	.524	397.4	1149.7	28444.7	7437.6	
8-36	308			90.77	9.30	.035	.112	1.507	.407	2541.5	8133.0	109432.3	26554.7	
0-12	319	{ 1 mile north of Draco.....	Caldwell.....	53.01	6.98	.083	.066	4.756	.858	885.9	6699.7	50423.1	9006.5	
12-36	320			53.61	4.61	.032	.073	5.299	.684	1372.4	3130.7	227263.5	30335.4	
0-10	321	{ 1 mile s. w. of Vashit.....	Alexander.....	67.59	4.68	.038	.054	1.30	3.234	513.6	729.9	17573.4	43717.2	
10-36	322			57.72	4.06	.022	.047	1.507	3.238	1015.8	2170.2	69587.2	149517.8	
0-12	323	{ 3 miles n. of Emanuel Church.....	Caldwell.....	76.73	4.49	.032	.028	3.574	2.282	491	429.6	54846.6	35020	
12-36	324			69.52	2.04	.020	.043	2.379	2.72	1112.3	2391.4	132310.4	151275.5	
0-12	353	{ Crabtree Falls.....	Mitchell.....	57.60	5.46	.044	.07	1.64	2.35	506.8	806.4	188028	27072	
12-36	354			36.98	2.79	.029	.091	1.75	2.29	857.9	2392.1	51772	67747.3	
0-8	357	{ Wood Mt.....	McDowell.....	62.50	10.53	.104	.007	2.75	1.34	1300	87.5	34375	16750	
8-36	358			57.73	9.30	.033	.054	1.63	1.17	1524	2494	75279.9	54034.3	
0-10	377	{ ¼ mile n. w. of Alexander....	Buncombe.....	73.59	3.29	.046	.036	2.41	3.59	677	529.8	35470.3	52837.6	
10-28	378			79.40	2.73	.026	.026	2.37	3.09	1651.5	1651.5	150642	196276.8	
0-8	379	{ 1½ m. w. n. w. of Alexander...	Buncombe.....	79.87	2.53	.036	.010	3.71	1.69	575	159.7	59263.5	26996	
8-22	380			86.38	2.94	.021	.031	3.93	1.37	1451.2	2142.2	271578.7	94672.5	

COMPOSITION OF PORTER'S LOAM.—Continued.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth 2 mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Acre.				
					Vol- atile matter.	Nitro- gen.	Phos- phoric acid.	Potash.	Lime. CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.
0-8	814	4½ miles east of Zircouia.....	Henderson.....	95.00	9.44	.099	.132	2.13	.26	1881	2508	40470	4940
8-36	815			100	8.90	.026	.135	1.89	.16	2080	10800	151200	12800
0-7	821	A. Cannon's farm.....	Henderson.....	100	5.26	.079	.086	1.89	.16	1580	1720	37800	3200
7-36	822			100	7.22	.036	.089	1.55	.101	2880	7120	124000	8080
0-8	827	8½ miles n. w. of Horseshoe....	Henderson.....	97.8	15.73	.202	.208	1.46	1.04	3951	4068	28558	2034
8-36	828			92.12	10.34	.053	.222	1.39	.08	3906	16361	102437	5896
0-10	830	6 miles n. w. of Horseshoe....	Henderson.....	100	11.04	.154	.083	1.95	.50	3080	1660	39000	10000
10-36	831			95.50	5.21	.017	.066	1.81	1.54	1299	5042	138284	117556
Average for Transylvania County.....				94.60	9.57	.102	.092	2.25	.344	1900	1846	42216	6545
				94.46	8.52	.038	.102	2.11	.296	2907	7799	156789	22749
Average for Henderson County.....				92.09	9.02	.1113	.152	1.99	.199	2088	2676	35478	3774
				94.83	7.51	.0373	.20	1.92	.311	2805	15037	142659	23744

COMPOSITION OF PORTER'S LOAM.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth $\frac{1}{2}$ in.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Acre.				
					Vola- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash.	Lime, CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime, CaO.
0-7	381	3 1 miles n. w. of Luther	Buncombe	92.94	6.24	.146	.07	1.43	.96	2714	1301	26581	17814
7-30	382			93.90	5.10	.036	.01	1.54	1.03	2704	751	105585	77374
0-7	385	1 m. n. w. of Blackwell Spgs.	Buncombe	85.74	3.80	.042	.015	2.48	1.83	720	772	42427	31381
7-30	386			94.02	6.40	.033	.005	2.26	1.85	2482	376	169988	139150
0-8	369	Barnardsville	Buncombe	74.31	3.57	.106	.011	2.45	2.02	1575	163	36412	30021
8-36	370			81.86	7.52	.037	.005	2.23	2.44	2423	327	146038	159791
0-8	371	Democrat	Buncombe	79.55	2.39	.054	.03	1.19	2.00	859	477	18983	31820
8-36	372			81.65	3.07	.024	.005	1.51	1.71	1568	327	98633	111697
Average for Buncombe County.				83.14	4.00	.087	.039	1.89	1.70	1467	678	31088	27767
				87.86	5.52	.033	.006	1.89	1.76	2294	445	130061	122003

COMPOSITION OF PORTER'S BLACK LOAM.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth $\frac{1}{8}$ mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Acre.			
					Volatile matter.	Nitrogen.	Phosphoric acid.	Potash.				
									Nitrogen.	Phosphoric acid.	Potash.	Lime, CaO .
Average of	all analyses of the type.											
					Surface							
					Subsoil							
0-12	682	} 4½ miles north of Brevard...	Transylvania	96.16	18.63	.475	.345	2.05	1.175	6925	39646	22619
12-36	683			93.92	12.06	.245	.268	2.185	1.125	15650	169206	84519
0-10	825	} 11½ miles n. w. of Horseshoe.	Transylvania	97.2	18.54	.46	.30	3.11	1.28	5832	60458	24883
10-26	826			96.2	9.88	.17	.22	3.30	1.12	16431	253968	86195
				95.12	18.72	.49	.39	.99	1.07	7419	18834	20356
				91.64	14.24	.32	.196	1.07	1.13	23460	78444	82843

COMPOSITION OF PORTER'S BLACK LOAM.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth $\frac{1}{8}$ mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Surface, 6 $\frac{1}{2}$ inches. Subsoil, 28 inches.			
					Volat- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash. CaO.				
Average of all the analyses of the type.....			{ Surface..... Subsoil.....	76.90 75.29	15.05 9.12	.32371 .163	.185 .1161	1.94143 1.9589	5003 9917	2943 7168	29408 76504	20369 95037
0-18 18-36	309 310	{ $\frac{1}{2}$ mile s. e. of Ilbritten Mt....	Caldwell.....	71.88 69.99	9.31 4.84	.16 .075	.115 .073	2.66 2.761	2300 4199	1653 4087	38240 15459	11213 37235
0-12 12-36	311 312	{ $1\frac{1}{2}$ miles west of Draco.....	Caldwell.....	72.57 75.89	8.12 7.79	.156 .067	.110 .079	1.73 1.358	2254 4069	1697 4896	25109 82447	10595 34333
0-15 15-36	327 328	{ Lick Mount.....	Caldwell.....	65.82 70.55	8.98 4.22	.152 .047	.120 .075	2.67 2.937	2001 2655	1580 4233	35148 16702	11189 40411
0-12 12-30	339 360	{ Oges Creek.....	Yancey.....	86.62 67.63	19.00 12.15	.53 .28	.273 .09	2.02 1.69	8758 15149	4511 4869	33378 91436	28752 230483
0-10 10-36	361 362	{ 1 mile north of Burnsville.....	Yancey.....	71.95 78.81	25.11 13.90	.54 .34	.192 .165	1.45 1.70	2.71 1.81	2763 10403	20867 117182	26478 108127
0-10 10-36	363 364	{ Mount Mitchell.....	Yancey.....	84.73 81.19	21.15 11.97	.44 .23	.328 .201	1.48 1.51	7456 14939	5558 13055	25080 98078	29147 109769
0-10 10-30	399 400	{ $2\frac{1}{2}$ miles s. w. of Turnpike.....	Buncombe.....	88.72 83.01	13.67 8.95	.288 .105	.160 .130	1.58 1.72	5110 6973	2839 8633	28036 114222	25206 94963
Average of all analyses from Caldwell Co....			{ Surface..... Subsoil.....	70.09 72.14	8.80 5.62	.156 .063	.115 .0756	2.35 2.36	2185 3641	1643 4405	32832 38203	10999 37326
Average of all analyses from Yancey Co.....			{ Surface..... Subsoil.....	79.76 79.21	21.75 12.67	.503 .283	.264 .152	1.65 1.63	3426 17175	4277 9442	26442 102232	28126 149439

Depth to Which Sample Was Taken	Sample Number	Location.	County.	Percent of Fine Earth 2 mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Acre.			
					Volat- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash. CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.
Average of		all the analyses of the type	{ Surface..... Subsoil.....	94.82 99.244	8.10 14.39	.097 .03	.067 .1326	1.63 1.908	1857 2382	1290 8285	39717 151334	9136 7372
0-5	674	{ ½ mile n. e. of Selica.....	Transylvania.....	100	11.64	.15	.08	1.08	3000	1600	21600	1800
5-36	675			100	29.83	.03	.179	1.62	2400	14320	126000	4000
0-12	684	{ 3 miles n. w. of Brevard.....	Transylvania.....	96.5	7.18	.09	.048	.76	1737	926	14668	2509
12-36	685			100	12.29	.03	.16	.91	2400	12800	72800	12000
0-6	808	{ 2½ miles n. w. of Etowah.....	Henderson.....	92.25	5.73	.072	.08	1.12	1328	1476	20664	37454
6-36	809			100	10.37	.026	.092	2.28	2080	7360	182400	11440
0-5	812	{ 2 miles n. w. of Horseshoe....	Henderson.....	85.35	7.49	.082	.048	2.44	1400	809	41631	1878
5-36	813			96.22	9.56	.03	.16	2.16	2309	1185	166268	4619
0-5	823	{ A Cannon's farm.....	Henderson.....	100	8.48	.091	.082	2.75	1820	1640	55000	2040
5-36	824			100	9.90	.034	.072	2.57	2720	5760	205600	4800

COMPOSITION OF PORTER'S CLAY.

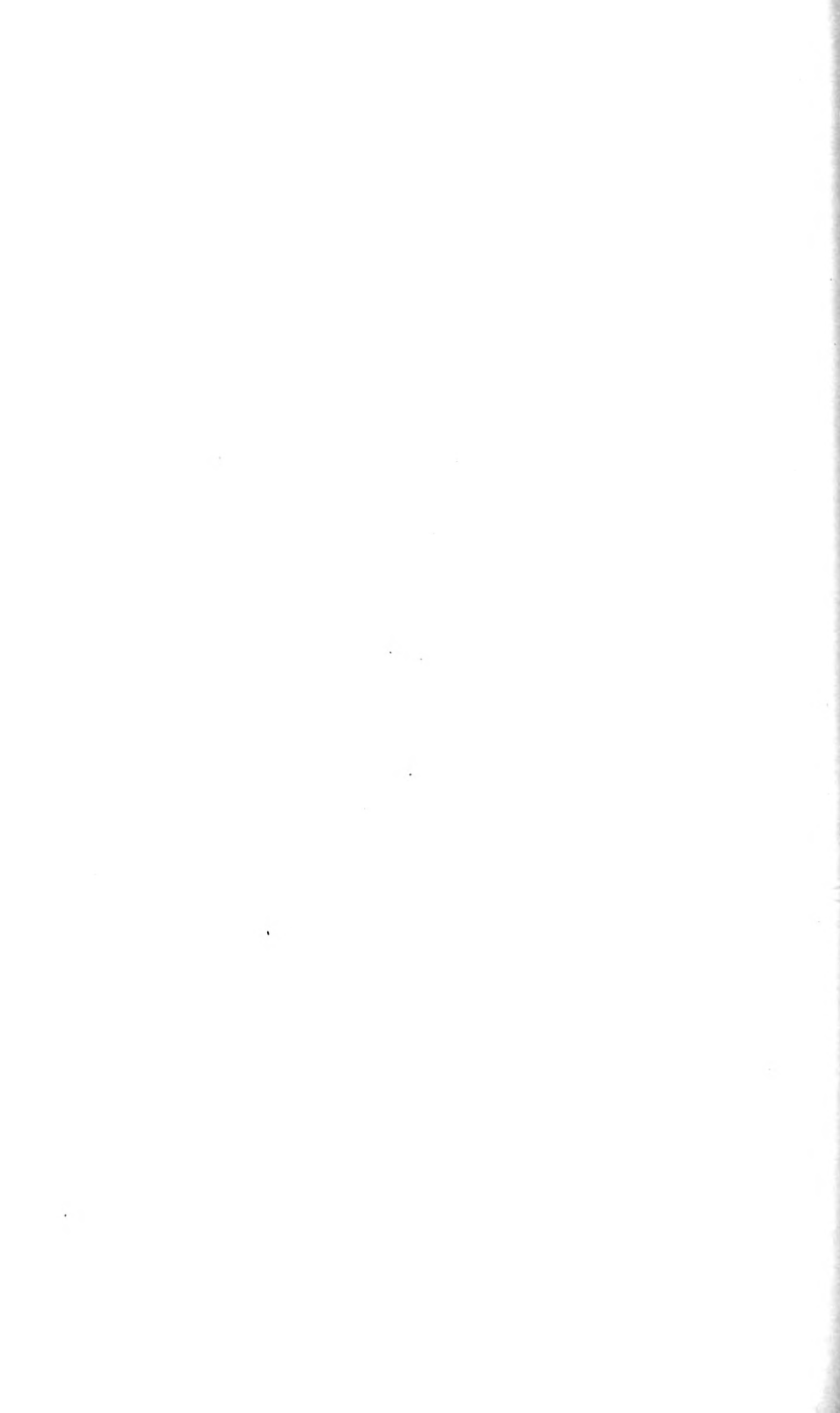
Depth to Which Sample Was Taken	Sample Number.	Location.	County.	Percent of Fine Earth $\frac{1}{2}$ mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Acre.						
					Vola- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash.	Lime CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime CaO.		
Average of all the analyses of the type----					{ Surface	85.29	7.58	.087	.0417	.722	1.579	1454	860	12416	26388
					{ Subsoil	92.37	8.77	.0427	.0567	.682	1.544	3175	4182	50627	112841
0-7	313	{ Kings Creek-----	{ Caldwell	84.65	7.12	.081	.091	.809	.829	1371	1541	13696	14035		
7-36	314			92.72	9.16	.053	.093	1.056	.714	3931	6898	78330	52962		
0-6	317	{ 1 mile s. w. of Hibernia-----	{ Caldwell	76.92	7.28	.073	.081	.485	.667	1123	1246	7461	10261		
6-36	318			88.93	10.86	.033	.098	.377	.723	2348	6972	26821	51437		
0-7	365	{ Burnsville-----	{ Yancey	92.35	7.94	.06	.016	1.55	1.47	1108	296	28629	27151		
7-36	366			90.62	8.25	.04	.025	1.26	1.40	2900	1812	91345	161494		
0-6	367	{ Estatoe-----	{ Mitchell	77.62	9.84	.17	.008	.84	4.18	2639	124	13040	64890		
6-36	368			89.57	6.15	.024	.021	.77	4.48	1720	1505	55175	321019		
0-8	389	{ 3 1/4 miles n. e. of Weaverville--	{ Buncombe	88.00	8.09	.076	.048	.380	1.16	1338	845	6688	20416		
8-30	390			95.91	9.49	.05	.097	.30	.84	3836	7443	23018	64452		
0-6	391	{ 2 1/2 miles s. w. of Alexander ---	{ Buncombe	92.20	5.19	.062	.006	.270	1.17	1143	1106	4979	21575		
6-30	392			96.49	8.68	.056	.006	.330	1.11	4313	463	25473	85683		

COMPOSITION OF TOXAWAY LOAM.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth & mm.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Acre.			
					Vola- tile matter.	Nitro- gen.	Phos- phoric acid.	Potash. CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime. CaO.
Average of	all the analyses of the type	{ Surface Subsoil	{	100	18.39	.356	.282	1.65	7126	5640	34414	9943
				100	9.00	.409	.136	2.04	8734	10880	163667	48000
0-10 10-36	{ 665 666 }	{ Brevard Transylvania..	{	100	13.32	.24	.23	1.86	4800	4600	37200	13800
				100	7.84	.10	.11	1.86	8000	8800	148800	54400
0-10 10-36	{ 667 668 }	{ Blantyre State Farm Transylvania..	{	100	15.19	.26	.30	1.98	5290	6000	39690	7000
				100	5.58	.07	.108	2.40	5600	8640	192000	25600
0-8 8-36	{ 672 673 }	{ 1 mile n. e. of Calvert Transylvania..	{	100	32.22	.69	.49	1.22	13800	9800	24400	8200
				100	14.53	.12	.28	1.90	9600	22400	151000	9300
0-12 12-36	{ 680 681 }	{ 1 mile n. e. of Davidson River Transylvania..	{	100	15.09	.36	.24	1.91	7200	4800	38200	4800
				100	6.65	.10	.13	2.22	8000	10400	177600	13600
0-14 14-36	{ 706 707 }	{ 1 1/4 miles east of Angeline Henderson.....	{	100	13.30	.265	.184	1.63	5300	3680	32600	3320
				100	8.30	.115	.051	1.72	9200	4080	137600	123200
0-8 8-36	{ 836 837 }	{ 2 m. s. e. of Hendersonville Henderson.....	{	100	28.03	.43	.25	1.46	8600	5000	29200	9800
				100	11.12	.15	.14	2.13	12000	11200	170400	61600
0-8	867	Test Farm.....	Buncombe	100	11.56	.249	.28	1.485	4980	5600	39700	22680

COMPOSITION OF TOXAWAY FINE SANDY LOAM.

Depth to Which Sample Was Taken.	Sample Number.	Location.	County.	Percent of Fine Earth < 2 mm.	Vola- tile matter.	Percentage Composition of Fine Soil on Dry Basis.				Pounds of Total Plant Food Constituents per Surface, 6 $\frac{1}{2}$ inches 2,000,000 lbs. Subsoil, 28 inches 8,000,000 lbs.			
						Nitro- gen.	Phos- phoric acid.	Potash.	Lime, CaO.	Nitrogen.	Phosphoric acid.	Potash.	Lime, CaO.
Average of		all the analyses of the type											
0-8	678	{ 9 $\frac{1}{2}$ m. n. w. of Davidson River	{ Surface Subsoil	100	6.93	.42525	.432	2.60	.875	2505	2640	52000	17500
8-36	679			400	4.35	.030	.0797	2.6075	.845	2400	6380	208600	67600
0-10	680	{ Pisgah Forest	{ Transylvania.	100	5.22	.00	.109	2.04	1.47	1800	2180	40800	23400
40-36	691			100	3.90	.02	.07	1.99	1.16	1600	5600	150200	92800
0-12	792	{ 13 $\frac{1}{2}$ miles s. w. of Horseshoe	{ Henderson	100	7.45	.12	.14	2.80	.79	2400	2800	56000	15800
12-36	793			100	4.40	.01	.10	3.07	.80	800	8000	245600	64000
0-10	794	{ 1 $\frac{1}{2}$ mile south of Fletcher	{ Henderson	100	9.01	.167	.454	2.78	.78	3340	3080	55600	15600
10-36	795			100	6.12	.057	.077	2.53	.52	4560	6160	202400	41600
				100	6.04	.124	.125	2.78	.76	2480	2500	55600	15200
				100	2.67	.033	.072	2.84	.90	2640	5760	227200	72000



LEAF TOBACCO SALES FOR APRIL, 1911.

Pounds sold for producers, first hand.....	2,426,291
Pounds sold for dealers.....	177,919
Pounds resold for warehouses.....	172,933
Total	<u>2,777,143</u>



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CO-OPERATIVE EXPERIMENTS AND DEMONSTRATIONS.

**SUGGESTIONS AS TO SOIL IMPROVEMENT, CULTIVATION OF
CORN, COTTON AND THE LEGUMES.**

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RALEIGH, N. C., MAY 19, 1911.

SIR:—I submit herewith manuscript on Co-operative Experiments and Demonstration work, with suggestions in soil improvement, and the cultivation of corn, cotton and the legumes.

I recommend its publication in Bulletin form.

Respectfully,

T. B. PARKER,

Director Co-operative Experiments and Demonstration.

TO HON. W. A. GRAHAM,

Commissioner of Agriculture.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

CO-OPERATIVE EXPERIMENTS AND DEMONSTRATIONS.

SUGGESTIONS AS TO SOIL IMPROVEMENT, CULTIVATION OF CORN, COTTON AND THE LEGUMES.

BY

T. B. PARKER, DIRECTOR CO-OPERATIVE EXPERIMENTS AND DEMONSTRATION,
AND T. J. W. BROOM, ASSISTANT DEMONSTRATOR.

The Department of Co-operative Experiments was created by the State Board of Agriculture for the purpose of assisting the farmers of the State in building up a permanent and profitable system of agriculture.

Briefly stated, the plan of the work is to locate a few farms of one or more acre each in a county, on soils of ordinary fertility, and establish such rotation of crops as are adapted to the soils, giving due consideration to the legumes, such as the cowpea, the soy bean, the clovers and vetches, for soil improvement and for hay; rye, oats and barley will also receive attention as winter cover crops, for green soiling and green manuring. Instructions will be given relative to the preparation of the seed bed, the application of fertilizers, and the cultivation of the crops. Assistance will also be given in the selecting and securing of seeds of the varieties best suited to the soil and climate.

With this brief outline of the purposes and plan of the work, the fundamental principles and salient points may be summarized as follows:

(1) A deep seed bed, well drained, well prepared, and filled with vegetable matter.

(2) Good seed of the varieties best suited to the soil and climate.

(3) For corn and cotton rapid and shallow cultivation during the growing season.

(4) Systematic crop rotation.

(5) The growing of legumes for forage crops and soil improvement.

(6) Winter cover crops to prevent leaching, surface washing, and to add vegetable matter.

(7) The conservation and utilization of all farm refuse, farm manures, and a wise and judicious use of commercial fertilizers.

THE SEED BED.

Upon the character of the seed bed, more than anything else, depends the success or failure of the crop. It is well, therefore, that farmers study the character and needs of the various crops grown; the soil conditions in which the different plants thrive best, their requirements in respect to food and water, and as nearly as possible prepare the seed bed to meet the needs of each individual crop.

Plants, like animals, to thrive well, need a good supply of food and an ample, but not over abundant, supply of water. And yet many farmers fail to make necessary provision for a sufficient water supply in time of drouth; they also fail to prepare sufficient feeding ground for the roots of the crop, and consequently are doomed to reap a poor harvest. Fortunately, it is possible, and practical as well, to so prepare the seed bed as to fortify it in a great measure against the evil effects of drouth and at the same time prepare a vast storehouse for the manufacture of wholesome and available plant food by the micro-organisms in the soil.

A deep seed bed, well drained, well pulverized and filled with suitable organic matter is the best possible fortification against drouth, or even excessively wet seasons. No farmer should be content with a soil less than eight inches deep, and even deeper would be better. In deepening the soil we are increasing the feeding ground of the roots and enlarging its moisture-holding capacity as well. If we have four inches of soil it may be said that we have four inches of feeding ground; if eight inches of soil, eight inches of feeding ground; twelve inches of soil, twelve inches of feeding ground, and it is but fair to say that with deepening the soil its power to produce has been greatly increased.

Every observant farmer knows that the "back furrows" in his fields show a marked increase in productive power, and that the "dead furrows" show a pronounced decrease, and that the terraces when planted and cultivated produce the best crops in the field. There are two reasons for this: a greater depth of soil, and better drainage and consequently a warmer and more comfortable home for plant roots.

The problem which confronts us is how to get the entire field in the condition occupied by the terraces and "back furrows" and keep it in that condition, and upon the proper solution of this question depends the permanent fertility and productive power of any field.

Deep plowing alone will not give the effective conditions required; on the other hand, if the plowing be improperly done, or at the wrong season, or when the soil is not in proper condition, partial or permanent injury may result. Neither will deep plowing, though it be done properly and at the proper time, and the mere application of commercial fertilizers, though the application be heavy, followed by a

system of continuous cropping in clean cultivated crops, and the crops removed, give the necessary conditions to produce profitable crops.

A soil, to be effective and of high productive power, must be granular, porous, mellow, easily pulverized, and these conditions are obtained and maintained by an abundant and deep incorporation of suitable organic matter, and if the soil is not naturally well drained, by adequate underdrainage.

When these conditions co-exist the soil moisture will be retained in sufficient abundance, and will permit adequate circulation of air in the soil; heavy rains will pass into the soil readily and deeply, the excess going off in the underdrainage, while that retained will be in best form for use by the crop and for the promotion of microscopic life in the soil. When wholesome soil-water and soil-air and suitable organic matter occur in abundance, and are well and deeply distributed through the soil, the micro-organisms of the soil, and the roots of crops follow, then we have an effectively deep soil and begin to see results in the form of larger and more profitable crops.

A field thus fitted has large productive capacity because there is a large area of soil per acre in which the soil organisms can multiply, and in association with water and air transform organic and mineral matter into plant food material, and disseminated through the soil in such manner as to afford an ever-ready and available supply to the crop.

With this glimpse at the character of a soil, effectively deep and of high productive power, we will consider ways and means by which we may prepare, construct, and have for our very own a soil teeming with microscopic life, and of high productive power. And by adopting these methods we will no longer farm our lands in such manner as that in a few years we have nothing in the form of soil, save a mere skeleton, depleted in fertility, and in many instances washed and gullied. Or as might be better expressed in the simile of a bank robber, who enters a bank, takes everything of value he can carry away, leaving the furniture and fixtures abused and so wrecked that they can be repaired only at great cost. We no longer want to conduct our farms in the similitude of a bank robber, but on the other hand we want to farm our land and conduct our farming operations with the dignity and intelligence of a bank president; directing the affairs of the farm in such manner that good dividends may be declared, the capital stock, which is our soil, remain intact, and a nice surplus fund laid up in the soil each year in the way of increased fertility.

It is impossible to write down specific directions, or modes of procedure that will apply in every case, suit all conditions, or that are practical in all seasons. However, some general instructions may prove beneficial for our guidance, and can be conformed to as nearly

as the seasons, soil conditions, and the best judgment of the farmer may allow.

In the matter of the preparation of the soil, with reference to deepening and permanently improving it, drainage is to be considered first, and if the soil is not naturally well drained, underdrainage must be provided, if permanent and profitable results are to be obtained. Emphasis is placed upon tile drainage, because we believe it is destined to play a great part in the future agricultural development of our farms. It very manifestly has a specific work to perform in increasing the depth, fertility and productive power of many of our soils. It is expensive work, but we will often get back the initial cost in the first crop, and most certainly in two or three crops, and then we will have the satisfaction of knowing that we have a field or farm that we can permanently improve, and that wet seasons will never knock us out of a crop. This is a question that the farmer will do well to investigate, especially as it relates to his own soil, remembering that good tillage can never be practiced unless the land is well drained, and that fertilizers and manures are worth little without good tillage. Much more might be said relative to the good effects of tile drainage, but the subject is too large to be treated here. It is our hope, however, that the farmer will consider the suggestions offered and pursue the subject further.

Plowing to deepen the soil should be done in the fall or early winter, usually the earlier the better, and whenever possible or practical a winter cover crop of rye, oats, barley, vetch, crimson or burr clover, should be used. If the land is being prepared for cotton perhaps rye alone, as a general rule, would be better, as the clovers and vetch would not have time to get in their best work before time to begin the spring preparation for cotton. If for corn, the clovers or vetch should go with rye, oats or barley. The cover crops and methods of getting them on the land will be considered later, as will also their virtues. Deep fall plowing permits winter weathering, which greatly improves the mechanical condition of stiff and heavy clay soils, and is a very effective means of deepening the soil, especially where organic matter is turned under. The furrows should be set on edge, or at an angle of thirty to forty-five degrees, this will permit better aeration of the soil, the subsoil is not turned out, and the rains will penetrate readily. If the soil is stiff or heavy, or is easily puddled, it is better to let it lie rough as left by the plow. In this instance, however, when the condition of the soil is not such as would preclude the probability of its germinating, it is advisable to sow rye broadcast before plowing. The writer has sown rye in this manner as late as the middle of November and secured a fair stand when furrows were edged. The great need of soils of this character aside from deep plowing and drainage, is a strong and deep in-

corporation of vegetable matter, and every available opportunity should be used to grow it on the land. When soils of this character are underdrained, plowed deep, and vegetable matter mixed in, it so improves their texture and physical condition that they become wonderfully productive.

When the soil is not well drained it is advisable to break the land in beds or ridges, rather than flat break it; this will keep the soil above standing water and permit of surface drainage by means of the dead or water furrows.

For the average farmer it will probably be more economical to deepen the soil gradually, by plowing say one or two inches deeper each time he plows until the desired depth of soil is obtained. Or if desired, the subsoil plow can follow the turn plow and the whole depth be attained at once. Or better still, if the disc plow is used the whole depth may be reached at one operation. Another method, though not to be recommended as a general practice, and which applies more particularly to stiff and heavy clays and where drainage is not sufficient, and may be employed very advantageously at times when the farmer can do no better, and often proves very efficacious on soils as above described, is the use of the combined middle burster and subsoil plow, and operated as follows: run middle burster in center of cotton middles, going over the field in this manner, then take off the wings and run subsoil point in same furrow; rye can then be sown at the rate of three pecks to one bushel per acre, the stalks lifted with middle burster and subsoil point run as in the middle. This method will expose much of the soil to the weather and if done by middle of December or before will permit the growing of a cover crop. At any rate, this method is preferred to leaving the land bare and unplowed through the winter.

Light sandy or leachy soils should not be plowed deep in the fall, except when there is vegetable matter on the land to be turned under, and then a winter cover crop of rye, at least, should be sown at the rate of three pecks to one bushel per acre and covered with a harrow.

It is not practical, or even possible, for the farmer to plow all of his land deep every fall, but rotations can be so arranged and the farm work so planned, that he can do deep plowing in the fall on a portion of his farm, the next fall another portion, and the next another, and thus have a rotation of deep plowing as well as of crops.

Some of the advantages of doing deep plowing in the fall are (1) the subsoil is dry, in the spring it is usually too wet; (2) the teams are not otherwise employed for much of the time, the days are short and cool, making it more comfortable for the team; (3) permits winter weathering, thereby improving the textural, physical, and mechanical condition of the soil, causing it to pulverize easily in the spring; (4) the winter rains sink into the soil readily and deeply, and mois-

ture is stored for the summer's crop; (5) it facilitates spring work, surface tillage being sufficient on deep fall plowed fields, the spring work can begin early and before the subsoil is in condition to plow; (6) it assures an earlier start in the spring, a better seed bed and a larger crop.

Fortunate is the farmer who gets his fields broken deeply in the fall or early winter, and whenever practical or possible a winter cover crop of crimson or burr clover, vetch, rye, oats, wheat or barley, or some of all. It is an inspiration to him as he prepares for spring work to look over his fields, dressed in green, teeming with soil and vegetable life, carrying upon their bosom food for the production of eggs, pork, milk, butter, beef, mutton, etc., and organic matter for the enriching of his soil. He is happy in the consciousness that he is working in harmony with the great forces of nature in improving his farm, causing it to bring forth crops sufficient for the needs of his stock, the demands of his family, and the feeding and enriching of the world, and as he proceeds with the spring work aspirations are kindled within his breast for greater achievements upon his farm.

PREPARATION FOR COTTON.

When the cotton lands have been broken deeply in the fall or early winter, deep replowing in the spring is not necessary or advisable. Good surface tillage four inches deep to thoroughly pulverize the soil prepares a seed bed that is ideal for cotton. This work can be performed rapidly and effectively with the disc harrow, a couple of discings at an interval of a week, and the liberal use of the spike tooth harrow, Acme harrow, or plank drag. The idea is to begin early so as to conserve moisture, frequently to destroy grass and weeds in the germinating stage, and at the same time prepare a fine, mellow and firm seed bed, and make plant food available. Farmers as a rule have not appreciated the value of surface tillage tools and their frequent use in the spring preparation of the soil. A fine seed bed assures, if good, sound seed are planted, prompt germination, an even stand, and an early start in the growth of the plant. Better be two weeks late in planting, and plant on a thoroughly prepared seed bed than plant early on a poorly prepared seed bed. There are more failures due to faulty preparation than to any other one thing in soil management.

As to methods and distance of planting, these will have to conform to local conditions and fertility of soil. On cold and poorly drained soils the ridge method will be better; on well drained soils that warm up early, level planting is preferable. The width of the rows should conform to the fertility of the soil, three to five feet wide and twelve to twenty-four inches in drill, the better the land the wider the row and spacing. Usually cotton is left standing too thick in drill for best results.

FERTILIZING THE COTTON CROP.

In the use and application of commercial fertilizers great care and judgment should be exercised. The fertilizer bill is usually the largest item of expense that enters into the production of the crop, and since an insufficiency of any one of the elements of plant food places the limit on the power of the soil to produce and renders valueless, so far as the immediate crop is concerned, any over abundance of the other plant food elements, due consideration should therefore be given to the soil in respect to its deficiencies in the various elements of plant food, in order that these elements may be purchased and applied in quantities proportionate to the needs of the soil and requirements of the crop.

It may be well to consider how much of the plant food elements, nitrogen, phosphoric acid and potash, are removed from the soil of an acre of land, in the production of a crop of five hundred pounds of lint cotton, that we may better understand the requirements of the cotton plant, to produce a given amount. According to a summary of experimental work with cotton by Mr. B. W. Kilgore, State Chemist, thirty pounds of nitrogen, twelve pounds of phosphoric acid, thirteen pounds of potash, are removed in the seed and lint (900 pounds seed and 500 pounds lint) and this does not vary greatly from the average of several analyses, and may be assumed as approximately correct. One and one-half pounds nitrogen, one-half pound phosphoric acid and two pounds of potash are removed in the lint. Twenty-eight and one-half pounds of nitrogen, eleven and one-half pounds of phosphoric acid and eleven pounds of potash are removed in the seed. Sixty-seven and seven-tenths pounds of nitrogen, twenty-six and one-half pounds of phosphoric acid, and fifty-nine and three-tenths pounds of potash enter into the production of the stalks, leaves, burs, etc., making a total of ninety-seven and seven-tenths pounds of nitrogen, twenty-eight and one-half pounds of phosphoric acid, and seventy-two and three-tenths pounds of potash removed from the soil by a crop of this size. However, more than two-thirds of the nitrogen and phosphoric acid, and nearly five-sixths of the potash are returned to the soil in the stalks, leaves, burs, etc., and if the seed are returned to the land on which they grew, and the lint only is sold, very little fertility has been removed from the soil in the production of the crop. And if the seed were exchanged for meal, at the present ratio of exchange, pound for pound, or if they were sold and the proceeds invested in fertilizers and these fertilizers applied to the soil from which the seed came, there would be a large balance of plant food to the credit of the soil, and the five hundred pounds of lint would be more than free, so far as depletion of soil fertility is concerned. It is seen in the light of the foregoing facts that when only the lint is

sold that cotton is not an exhaustive crop, and yet many of our cotton soils are being annually depleted of fertility and becoming poorer and less productive by growing cotton continuously. It may be worth while to inquire why this is so. Formerly cotton seed were considered worthless, and they were left to rot around gins and otherwise go to waste; later when they acquired a money value they were sold off the farm and their equivalent, or money value in nitrogen, phosphoric acid and potash, was not returned to the soil from which they came. More nitrogen has been removed annually from the soil in selling the seed and lint than was returned to it; phosphoric acid and potash may have been returned and doubtless have in most instances to have maintained the yield or even increased it had the supply of nitrogen been maintained; but the supply of nitrogen has been steadily decreasing, and therefore the productive power of the soil has been annually lowered and limited by this deficit in the nitrogen.

But if failing to return as much fertility to the soil as is removed in the crops were the only way our soils have been depleted, they would not have run down so fast. They have been robbed of nitrogen by winter leaching; and of nitrogen, phosphoric acid and potash by surface washing and gulying. Many of our soils have lost more in this way than in removing crops; and furthermore, carefully conducted experiments have determined that only fifty to seventy per cent of the nitrogen applied to the soil in commercial fertilizers is recovered in the crop.

Therefore, understanding the amount of plant food entering into the production of a crop of a given size, and with the knowledge of what is removed or sold off in the crop, and the losses by leaching and surface erosion understood, and it is remembered that not all of the nitrogen applied in fertilizers is recovered in the crop, the farmer can proceed with intelligence in the application of his fertilizers and, under normal conditions, with a large degree of certainty as to results. If rotation of crops is practiced and legumes grown and winter cover crops put on to prevent leaching, surface washing and to add organic matter, the farmer knows that the soil-nitrogen has not been depleted, and knowing something of the nitrogenous content of the soil and its deficiency or sufficiency as relates to phosphoric acid and potash, he can calculate very nearly how many pounds of each element of plant food necessary to apply to an acre of land to produce a given amount. And if he has sufficient nitrogen in the soil, by means of turning into the soil a large crop of peavines or clover, or both, to make one and one-half to two bales of cotton, it is an easy matter to increase the applications of phosphoric acid and potash, if these elements are not already sufficient in the soil, to balance with the increased supply of nitrogen, to obtain full benefit of the nitrogen.

Since nitrogen enters more largely into the production of the crop than any other element of plant food, and that it is most cheaply obtained, and a large supply maintained in the soil by a system of rotation that admits of the growing of summer and winter legumes, to get this much-needed nitrogen free from the air, and that cover crops can be grown to prevent losses by leaching and surface washing, and to add vegetable matter, and when good tillage methods are practiced it is seen that the maintaining of a standard of from one to two bales per acre is a simple matter. When there is an abundance of organic nitrogen in the soil, it is not necessary to apply a large amount of nitrogen in the fertilizers, just enough to give the plant a quick start and carry it along until the soil warms up and the micro-organisms of the soil begin to convert the organic nitrogen into soluble nitrates, after which an abundant supply is afforded the plant.

On the other hand, if crop rotation is not practiced, legumes are not grown, the soil is let to lie, to lose plant food by leaching and surface washing and the seed are sold off and their equivalent in nitrogen not returned, it does not require much figuring to see that an ever-increasing supply of nitrogen will have to be purchased to maintain a given yield.

From "Southern Field Crops" by J. F. Duggar, published by The MacMillan Co., we get the following facts, concerning fertilizers, of interest to our farmers:

POTASH.

"In determining the probable requirement of cotton for potash, note should be made of the proportion of clay or silt compared with the proportion of sand. Clay and silt are frequently formed from materials rich in potash; hence the more clay or silt the soil contains, the less, as a rule, is the need for potash.

"However, some clay soils contain a large amount of potash, but in an unavailable form. In this case the potash can often be made available by improved preparation and cultivation and by the addition of vegetable matter. The sandier the soil and subsoil the greater is the need for potash.

NITROGEN.

"The proper proportion of nitrogenous fertilizer to acid phosphate in a fertilizer formula for cotton depends more on the recent cropping and manuring of the field than from the character of the rocks from which the soil has been derived. One can usually decide if nitrogen is needed by considering the following facts:

"(1) Small stalks (if not due to climatic influences, poor cultivation, etc.), are usually an indication that nitrogen is needed.

"(2) Excessive stalk or 'weed' growth of cotton is an indication that nitrogen can be dispensed with, wholly or partially.

“(3) The fresher the land the less the need for nitrogen.

“(4) Phosphate hastens maturity and may make more severe the injury from cotton rust.

EFFECTS OF FERTILIZERS ON MATURITY.

“Cotton growing on poor land is late in maturing, unless the process be hastened by the loss of leaves from rust, or by the premature death of the plants.

“Acid phosphate decidedly hastens the maturity of cotton. Its use enables the farmer to obtain at the first picking, or at the first and second pickings, a larger proportion of the total crop of cotton than by the employment of any other single fertilizer. Other forms of phosphoric acid, including raw phosphate and basic slag, when used in connection with stable manure, have also been found to hasten maturity.

“Nitrogen in commercial fertilizers in small or medium amounts somewhat favors early maturity. When a nitrogenous fertilizer is combined with acid phosphate, the highest degree of earliness is secured. On the other hand, ripening is retarded if the amount of nitrogen be excessive or if a nitrogenous fertilizer be applied very late.

“The use of potash usually causes the crop to retain its leaves and to continue growing late into the fall.

“The use of kainit often prevents rust and should be used on soils where rust in cotton occurs. Experiments have shown that on some soils muriate of potash is as effective for rust as is kainit. At the Alabama Experiment Station 100 pounds of kainit per acre was as effective in stopping rust as were 200 pounds. It seems to be unknown why potash stops rust, but it is nevertheless worth while for persons who are troubled with rust in their cotton to give it a trial, even if they do not apply more than 75 pounds per acre. We doubt the advisability of applying a less quantity than this.”

In applying the fertilizer to the soil, it is better to apply the phosphoric acid and potash at least ten days or two weeks before planting, and if cotton seed meal, blood or tankage is used as sources of nitrogen, all may be mixed together and applied at the same time.

If heavy applications are made, 400 pounds and upwards, a distributor should be used that will cover a space of ten or twelve inches or a cultivator should be run through the furrow to thoroughly mix the fertilizer with the soil. If nitrate of soda is used as a source of nitrogen, it is better to apply at planting time twenty-five to forty pounds per acre, or a few days after planting, by distributing on the top of the row just before the cotton comes up; other applications later if needed.

The cotton crop pays for liberal fertilization, and when good tillage methods are practiced, and cover crops grown to prevent loss of plant food by leaching and surface washing, and to add vegetable matter to keep the soil in good physical condition, cotton can, when liberally fertilized, be grown on the same land continuously and profitably. However, it is better to have some system of rotation in which legumes can be grown. Recently conducted experiments with soil types indicate that under good methods of farm practice, a fertilizer analyzing ten per cent phosphoric acid, two per cent each of nitrogen and potash, is about the proportion required in the Piedmont section of the State, and for the eastern sandy loam soils, seven per cent phosphoric acid, three and one-half per cent nitrogen and three per cent potash is about the right proportion; but on soils deficient in humus and lacking in nitrogen, a fertilizer containing as much as 4 to 5 per cent nitrogen may be used.

CULTIVATION OF THE CROP.

The cultivation of the crop should begin early, even before the cotton is up. The weeder or light slant-tooth harrow, or both, as the condition of the soil will permit, are the proper tools to use at this time, and the use of these should be continued at frequent intervals, or after every shower, until cotton is chopped to a stand. The use of these implements will prevent the formation of a crust and will conserve the moisture.

Chopping should be done as early as practical after the third leaf has formed, and each stalk given to understand what is expected of it before it acquires the spindling habit.

Cultivation should be rapid and shallow. The cotton plant responds very perceptibly to good cultivation. Frequent and shallow cultivation, every week or ten days, promotes early growth and development of the plant and hastens maturity. There is no plant that will bear more neglect than the cotton plant. It may be neglected in the early part of the growing season and afterwards given good cultivation and may make a good weed and put on a heavy crop of fruit, but it will be late in maturing and is often ruined by frost. Neglected cultivation is always at the expense of earliness, and in this section of the cotton belt earliness is desirable.

While the plant is small and the root system undeveloped, the cultivation may be three or four inches deep and no harm done, but after the fruiting period starts and the roots begin to fill the soil, the cultivations should be very shallow. Many farmers injure their crops very seriously in July by cultivating too deep, thereby often materially lessening the crop. One to two inches is usually sufficient depth to cultivate after fruiting begins.

It should be the ambition of every farmer to grow not less than a five-hundred-pound bale of cotton on every acre he cultivates, and if a system of farming is adopted as herein outlined it will only be a short while until it can be done.

THE CORN CROP.

The corn crop, because of its adaptability to every part of the State and of its value as a food crop for both man and beast, is perhaps the most important crop we grow. Every farmer attempts, or should do so, to grow the corn needed for his family and live stock. There is no crop, its importance considered, that has been more neglected and less care exercised in its economical production than has been the corn crop. For forty years the average production per acre of corn in the State was between thirteen and fourteen bushels. Every thoughtful farmer knows that growing corn on twelve-to-fifteen-bushels to the acre land is produced, all things considered, at too high a cost, that there is no profit or pleasure in such farming. It has been proven conclusively, and demonstrated time and again, that when proper methods are adopted corn can be grown as cheaply in North Carolina and as much per acre as can be grown anywhere. Many farmers, who have never produced an average of over fifteen bushels per acre, boast that they have never bought corn, but they have produced this corn at too great a cost and have derived little or no profit from such farming. They have made a living, it is true, but it has been at the cost of lots of hard work.

It should be the aim and ambition of every farmer to grow a minimum of not less than forty to fifty bushels of corn on every acre he cultivates. That it will take time and labor to do it, is true; deep plowing will have to be done, vegetable matter will have to be incorporated with the soil as already outlined, but there is not near the trouble in this that has been experienced in growing fifteen bushels per acre.

If three hundred bushels of corn are needed to meet the requirements of the farmer's family and the live stock on the farm, it will be much easier to grow it on six acres and at much less cost of labor and horse-power than to grow it on twenty. Besides, the other fourteen acres could be utilized for pasture, growing forage crops, or soil renovating crops, to be followed with corn or cotton, and in this way the standard of fifty bushels of corn or a bale of cotton to the acre can be realized and maintained all over the farm. The principal causes of the low corn yields in the State are shallow plowing, which has not given the proper depth of soil; the lack of vegetable matter, which is so much needed to furnish plant food and moisture; inferior seed, and faulty or improper cultivation. Large crops of corn can not be grown on a shallow soil. Soils that are not well supplied with humus,

decaying vegetable matter, will not carry sufficient moisture to produce a large crop of corn. Corn can not be grown cheaply and profitably by depending alone on large quantities of commercial fertilizers.

The essential conditions to a large and profitable corn crop are: a deep seed bed, not less than eight inches deep, and deeper would be better, well filled with quick decaying vegetable matter, preferably cowpeas, crimson clover, or some other legume; good seed of a variety suited to the soil and climate; a few hundred pounds of high grade acid phosphate and some potash; followed with good cultivation. The harrow or weeder should be started a few days after planting, going with the rows or across as the judgment of the farmer may dictate, and should be kept up at frequent intervals until corn is large enough to cultivate. When corn is eight or ten inches high, a deep cultivation may be given, four or five inches deep. Subsequent cultivations should be frequent and shallow, one and one-half to two inches deep, and the crust should be broken as quickly as possible after every shower to conserve moisture and to keep the soluble plant food confined to the sub-surface soil. If a crust is kept from forming after each rain, evaporation will be checked and the capillary water carrying soluble plant food will move towards the roots of the plants, because the demands of the plant for water and plant food causes the pull to be stronger towards the plant than to the dust-covered surface, and if the crust is not allowed to form the daily demands of the plant for water and plant food are satisfied; but if a crust is allowed to form, the pull on the water is towards the surface, the soluble plant food goes with it and is left at the surface, while the water goes off into the air, and if crust is allowed to remain unbroken very long much plant food will be brought to the surface, considerable water will be lost, and when the crust is broken the plant food is in the dry mulch where the roots of the plant can not reach it and the growth is checked until a shower comes and carries it down again. But if a heavy rain should fall before the hard crust is broken and runs off over the surface, much of the plant food would get in solution with the water and be carried away. So it is highly important to break the crust as quickly as possible after a rain, or better still, cultivate quickly to prevent its forming.

If a proper seed bed has been prepared, rows run five feet apart and a good variety of prolific corn is planted two feet apart in the drill, and three or four hundred pounds of fertilizer analyzing ten per cent phosphoric acid and three per cent potash, fifty bushels of corn to the acre may reasonably be expected. When stable manure is applied, it can be applied in the fall to the cover crop and when applied in this way a better corn crop is assured than if the application were made at, or a short time before, planting time. When applied in the spring it is better to apply after plowing and mix in the sur-

face soil with disc harrow. This applies to clay soils. On sandy soils it may be better to plow the manure in and give a deeper covering.

Corn is a vigorous nitrogen feeder, and if an abundance of nitrogen is not in the soil in the form of stable or green manure, it will be necessary to apply some in the fertilizers. However, very little should be applied at planting time, just enough to give the plant a start, and when corn is twelve to eighteen inches high a side application should be made, and if nitrate of soda is used, this should be applied when bunching to tassel. The corn plant, unlike the cotton plant, gets its full growth before developing the ear, and if there is not sufficient organic nitrogen in the soil at earing time, it is sometimes profitable to apply nitrate of soda. But nitrate of soda is expensive and an application of one hundred pounds to the acre will add five cents per bushel to the cost of a fifty-bushel crop of corn. It is always cheaper and more profitable to get the nitrogen through legumes and stable manure.

THE PLANTING SEED.

Not every farmer has rich land, but every farmer can have good seed to plant. Many farmers could increase their yield five to twenty bushels per acre, or even more, by planting better seed, and carefully selecting in the field from the best stalks the seed for the next year's crop and, as larger yields, as a rule, can be produced by growing prolific varieties, the seed should always be selected from stalks bearing preferably two ears, as the ears are apt to be larger when only two of them than where three or more are grown, and it is more convenient to handle two good ears than three smaller ones. The seed ears should be selected from strong, healthy stalks that have made the best showing under average field conditions. An ample supply should be selected in this way.

The blades or fodder should be left on the seed stalks and let stand until mature. This will add greatly to the vitality of the kernels, and strong vitality is an important factor in producing a strong, vigorous and productive plant. After the corn is well matured, gather and husk immediately and re-select, selecting the best developed ears with well-shaped kernels, and then string up under shelter in an airy place and let hang until thoroughly dry. It can then be stored away in a dry place where it will be protected from rats; and to protect from injury by weevils or other insects it should be treated with bi-sulphide of carbon. This treatment can be given by placing in tight barrel or box, the bi-sulphide placed in pan or shallow dish and set on top of corn, tightly covered, and let remain so forty-eight hours. The bi-sulphide fumes are inflammable and no fire, lighted match or lamp should be near.

When the seed corn is cared for in this way, its vitality is preserved, a good stand is assured and the chances of a better crop greatly enhanced.

CROP ROTATION AND COVER CROPS.

It is impossible to grow good crops on the same field year after year except by thorough tillage and cultivation, the addition of fertilizers and the proper rotation of crops to maintain the fertility of the land. Single crop farming in clean cultivated crops has proved to be the ruin of many a fertile field, and has led to the financial disaster of many hard-working farmers. There are many farmers who do not yet appreciate the value of a good rotation that admits of the growing of summer and winter legumes and other cover crops for the improvement of the soil. In this age of enlightenment, with the knowledge of better methods, and a better system of farming that is now ours, and with the opportunities for observing and acquiring information that we now have, and with the pernicious effects of the old system to be seen everywhere, should man be allowed to farm the land in such manner as to deplete its fertility, allow it to wash and gully, leaving it in worse condition than he found it and making it harder for his successor to earn a livelihood? Public sentiment should and will eventually put an end to such methods.

We rotate crops and grow legumes and cover crops because it is the cheapest way known to improve and maintain fertility in the soil. Vegetable matter is to the soil as grass, hay or forage is to live stock, or the vegetables on the farmer's table to his family, necessary as food and to keep it in good physical condition.

Vegetable matter carries nitrogen, and since nitrogen enters more largely into the composition of crops, and is the most expensive element in fertilizers, and hardest to retain in the soil, and the only element of plant food that can be gotten free by growing crops that will gather it from the air, and since it ranks next in importance to water in crop production, it is imperative that the farmer keeps at a high degree the vegetable contents of his soil, and puts on cover crops winter and summer to prevent leaching of soluble nitrogen, and to keep up the supply of nitrogenous organic material in the soil.

That we may better understand the importance of the legumes and how to grow them it may not be amiss to give some specific instructions in regard to some of them. These crops, which we know as cowpeas, soy beans, the clovers, vetches, alfalfa, etc., have the power of obtaining through the agency of bacteria peculiar to these plants free nitrogen from the air. But to grow these crops successfully there are certain soil requirements or conditions that must be met, otherwise the crop will be a failure. The soil should be well drained.

should be comparatively free from acidity and should contain the bacteria peculiar to the particular crop to be grown. Possibly the best way to get the inoculation is to secure soil from a field that has grown the crop successfully and sow with the seed at the rate of 500 or more pounds of soil per acre. If only a limited quantity of soil can be obtained, it will be well to moisten the seed and roll them in the soil and plant and cover at once.

When we realize that a ton of green cowpea vines, or soy bean vines, or green clover contains as much plant food as a ton of stable manure, we can better understand their value as a soil improver. Chemical analysis shows that hay made from the legumes are as rich in nitrogen as 8-2-2 fertilizers. Their fertilizing constituents in 2,000 pounds of dry hay are as follows:

	Lbs. Phos. Acid.	Lbs. Nitrogen.	Lbs. Potash.
Crimson clover	8.0	41.0	26.2
Japan clover	6.0	41.4	27.8
Red clover	7.6	41.4	44.0
Peanut hay	5.8	35.2	.....
Cowpea hay	10.4	39.0	29.4
Burr clover	10.7	43.3	32.0
Vetch	21.4	45.4	56.6
Alsike clover	13.4	46.8	54.6
Alfalfa	10.2	43.8	23.6

From the above it will be seen they are very rich in plant food, especially in nitrogen and potash.

COWPEAS.

The cowpea is so well known by all our farmers that it is unnecessary to give any detailed instructions in regard to it.

SOY BEAN.

The soy bean is not as well known as the cowpea, but its introduction into every part of the State is very rapid. In many sections, and on some soils it succeeds even better than the cowpea. Especially is this true in our mountains and on undrained soils. It will thrive on soils too wet for the cowpea to grow. The bacteria peculiar to the soy bean seems to be in most of our soils, therefore inoculation is usually unnecessary.

CRIMSON CLOVER.

Crimson clover in many sections is not so well known, but should find a home on every farm for the following reasons: (1) as a soil improver; (2) as a hay crop; (3) as a winter cover crop; (4) for early spring grazing.

This plant is an annual, making its growth in late fall, winter and early spring.

While crimson clover succeeds on a great variety of soils, it does best on fertile soil, but farmers will realize most benefit from it by sowing it on medium or thinner soils in order to bring them up to a higher state of fertility. This crop will thrive on soils that would not grow either a crop of alfalfa or red clover. A clay loam usually suits it best, though it will grow on extremes, from sand to heavy clay, if the soil contains the bacteria necessary for the plant.

PREPARATION OF THE LAND.

If it be sowed after a crop of cowpeas, cut the peas off for hay and disc the stubble and sow crimson clover seed on the disked land at the rate of 15 to 20 pounds of clean seed per acre, and either disc them or run a drag harrow over them. In central North Carolina this should be done in September, when the soil contains sufficient moisture to insure germination. In the western and mountainous parts of the State the seed can be sowed earlier at the last cultivation of the crops, usually with good results. If to be sowed in standing corn, the clover seed can be sowed at the proper time and cultivated in with a light cultivator or harrow. If sowed in cotton, that should be done about the time of the first or second picking, and immediately after the pickers and cultivated in as for corn. If the land is acid or sour, it may require liming to grow crimson clover, from two to five barrels per acre, according to the acidity of the land.

INOCULATION OF THE SOIL.

The surest way to succeed in getting land inoculated is by getting soil from a field that has grown crimson clover successfully the previous year, or from a field that is growing red or white clover. If soil is convenient apply as much as a wagon load per acre, though two or three hundred pounds will give partial inoculation. It will be a waste of time and seed to sow crimson clover on land that does not contain the bacteria, so, unless the crop has grown on the land for some time, the safest plan will be to inoculate the land before sowing the seed. The land may or may not already contain the bacteria, therefore the safest plan will be to inoculate.

This soil should not be sowed on the land during a bright sunny day as there would be danger of the sunshine killing the bacteria. Preferably, do this on a cloudy day or late in the afternoon and harrow in as quickly as the soil is sown. Sometimes "cultures" will give good results, but do not depend upon them. The soil plan never fails to give inoculation.

CRIMSON CLOVER HAY.

If the crop is intended for hay it should be cut just as it gets in full bloom. Do not wait for the bloom to commence to dry up as there will be danger in feeding the hay to horses if cut at that stage. The seeds form in a rough shuck or covering and when these are dry will form into balls in the horse's stomach or intestines and may cause death. Cut at the proper time it makes a fine and nutritious hay.

Reports show that in North Carolina crimson clover makes from a half ton to two tons of hay per acre, according to the fertility of land and inoculation of the soil. For the past year or two seed have been quite high and this fact has interested many of our farmers in saving seed for their own use and for sale. In the absence of clover hullers by which the seed can be threshed and hulled, farmers can save their seed in the following manner: Let the clover get fully ripe and cut when just damp enough from dew to prevent the seed from shattering, or better, cut on a cloudy day. Put into good size, well made cocks at once, and let remain several days, if there is no indication of rain. Haul to barn on a cloudy day or early in the morning, so as to prevent the seed from shattering, put in barn with tight floor. Let remain there until perfectly dry; then with a pitchfork fork the hay over, tossing from one place to another and the seed will shatter out. They will be in the shuck or rough, but those who have used them that way prefer them to the cleaned seed. Sow about 50 pounds in the rough to the acre.

VETCH.

There are many varieties of vetch, but the ones used mostly for soil improvement are the Hairy or Sand Vetch (*Vicia villosa*), and the so-called spring vetch (*Vicia sativa*), which also needs to be sowed in the fall months in North Carolina, to make a successful crop.

To succeed with vetch the soil needs to be inoculated the same as for crimson clover, except it must be inoculated with soil coming from a field that has grown vetch of some kind. Soil from a place that grows wild vetch or partridge pea is as good as that from a field where the cultivated vetch is grown. Also, soil taken from a place that grows English or Garden peas will inoculate vetch as they belong to the same family.

VETCH HAY.

Vetch makes a fine quality of hay, but when planted for that purpose it is well to sow it with wheat or oats, to hold the vetches up. Sow half bushel of wheat, half bushel of oats that will ripen at the same time the wheat will ripen, and half bushel of vetch per acre, in

September or early October, according to location. If vetch are sown alone sow one bushel of seed per acre, or when sown with wheat three pecks of wheat and half bushel of vetch; or one bushel of oats and half bushel of vetch per acre. If vetch are sown alone they can be put in at the last cultivation of the crops or any time from then until October. If vetch and oats are sowed together, sow in September. Vetch will reseed itself when the pods are allowed to ripen on the land. The seed should be covered from one to three inches deep according to the nature and condition of the land.

The writer has cut oats and vetch, when the oats were ripe, and threshed make a fine mixture of the two for sowing where persons want the mixture. If one wishes to separate the vetch from the oats it can be accomplished by running them through a grain fan with the necessary sieves for taking the vetch seed out. In this State vetch yields from a half ton to three tons of hay per acre. It is a valuable crop, both as a soil improver and a hay crop and should find a place on every farm.

BURR CLOVER.

Burr clover is another of the legumes that should receive more attention at the hands of our farmers than it is now receiving, especially is this true of the eastern and sandy soils of the State. To succeed with this the soil must be inoculated as with all the other legumes, but as seed in the burr are usually sown, and they are raked up from the land on which they grew, the burrs are apt to contain enough of the bacteria to give a partial inoculation, and by the second or third year, if the clover is permitted to grow on the same land, the inoculation will be complete.

This crop is better adapted to soil improvement than for other purposes, though it furnishes considerable grazing in late fall and early spring. The crop will re-seed itself if permitted to do so, so there will not be the trouble and expense of re-seeding each year as is the case with crimson clover.

The seed can be sowed at the last cultivation of crops or at any time from then until the middle of September and should be covered from one to two inches deep. If sowed early the seed will lie dormant until time to come up. Of clean seed, sow from 10 to 15 pounds per acre, and if seed are in the burr sow from three to four bushels per acre. Seeds in the burr usually give the best results.

RED CLOVER.

Red clover seems to succeed best in our clay sections and is so well known that it is needless to discuss it in this bulletin. We will simply add that the acreage should be greatly increased in every section where it succeeds.

JAPAN CLOVER.

This little plant is the hardiest of all the clovers. It grows along the roadsides, in old fields, and almost anywhere except in dense woods. With us it is not a hay plant, but furnishes good pasturage and its growth should be encouraged. It is a fine soil improver.

SUGGESTED ROTATIONS FOR CROPS.

No one system of rotation is suitable to all sections. It may be necessary to have a different system for each field on the farm. This is best determined by the individual farmer himself, and the following suggestions are merely to assist in establishing a system for the entire farm.

COTTON DISTRICT.

Three Year Rotation.

First Year: Cotton, followed by crimson clover, vetch or burr clover, sowed at last cultivation of cotton or after first picking, and until inoculation is secured for clover or vetch, rye or oats should be sowed with the clover or vetch.

Second Year: Corn with cowpeas or soy beans.

Third Year: Wheat or oats, followed by peas or soy beans. If oats are sown and it is desired to make hay of them, crimson clover or vetch should be sown with them and the quantity of hay will be increased and the quality improved, and nitrogen deposited in the soil, and if followed by peas and fertilized with acid phosphate and potash, three or four hundred pounds per acre analyzing 8-4 or 10-2 as the character of the soil may demand, two good crops of hay can be secured in the same season, worth from fifty to seventy-five dollars if it had to be purchased on the market. The pea stubble should be turned deeply in the fall and rye, oats or crimson clover sown to be disked in spring as has already been suggested for cotton.

If it is desired to turn under the peavines to add vegetable matter and still further improve the soil, there is no objection, but if the crop is very heavy it will be advisable to disc well before plowing so as to thoroughly incorporate the vegetable matter with the soil and thus improve the condition for the growth of a winter cover crop, which will prevent leaching and surface washing. This rotation gives an opportunity of doing deep fall plowing once in three years and is a desirable one whenever it is practicable to follow it.

Two Years.

First Year: Cotton.

Second Year: Wheat or oats, followed by peas, plowed deep in fall, cover crop put on and back to cotton.

Three Years.

First Year: Cotton, with rye or oats as winter cover.

Second Year: Cotton, with crimson clover as winter cover.

Third Year: Corn, with peas, plowed deep in fall after corn is cut off, with rye as winter cover, and back to cotton.

GRAIN DISTRICT.

Two Years.

First Year: Corn with peas.

Second Year: Wheat or oats, followed by peas, plowed deep in fall and sowed to crimson clover or vetch, rye or oats, and back to corn.

Three Years.

First Year: Red Clover.

Second Year: Corn with cowpeas.

Third Year: Wheat and red clover.

PEANUT DISTRICT.

Three Years.

First Year: Cotton with crimson clover.

Second Year: Corn with cowpeas or soy beans, with rye as winter cover.

Third Year: Peanuts, with rye as winter cover for cotton.

Four Years.

First Year: Corn with cowpeas or crimson clover.

Second Year: Peanuts.

Third Year: Oats, followed by cowpeas, plowed deep in fall with rye or crimson clover as winter cover.

Fourth Year: Peanuts.

Four Years.

First Year: Corn with cowpeas, with rye as winter cover.

Second Year: Peanuts, with rye as winter cover.

Third Year: Cotton, with rye as winter cover.

Fourth Year: Cotton, with crimson clover as winter cover, and back to corn.

TOBACCO DISTRICT.

Three Years.

First Year: Tobacco.

Second Year: Oats, or wheat, followed by peas, plowed deep in fall and sowed to crimson clover, vetch, rye or oats for winter cover.

Third Year: Corn, with peas, followed by rye as winter cover for tobacco.

Four Years.

First Year: Tobacco.

Second Year: Oats, followed with peas, plow deep in fall and sow crimson clover, vetch, rye, or oats for winter cover.

Third Year: Corn with peas, and rye as cover crop.

Fourth Year: Cotton, with rye as cover crop for tobacco.

The more legume crops grown in a rotation the better, and if some such system of rotation is adopted as suggested above and deep fall plowing, thorough tillage and good cultivation methods are practiced, and good seed are planted, and fertilizers used judiciously, and all farm manures saved and applied to the soil, a minimum yield of a bale of cotton, forty to fifty bushels of corn, forty to fifty bushels of oats, and a corresponding increase in all other crops grown, is not only a possibility, but is practically certain, as has been demonstrated by good farmers in all sections.

For badly run-down soils that are void of vegetable matter and their cultivation no longer profitable and their reclamation desired, it has been suggested that the land be plowed at the ordinary depth in the fall and sowed to rye, using two or three hundred pounds of a good fertilizer per acre, to aid in getting a good growth of rye, turn the rye in spring when in full bloom, sow an early variety of cowpeas early in June and disc in August and sow to buckwheat, plow deep in fall and sow to rye, to be turned in spring. In this manner much vegetable matter will be incorporated with the soil and will be in condition for cultivated crops, and when farmed in good rotation the productive power of the soil will increase annually.

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INSECT ENEMIES OF CABBAGE.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

LETTER OF TRANSMITTAL.

RALEIGH, June, 1911.

SIR—I transmit herewith material for a Bulletin on "Insect Enemies of Cabbage," which I think should serve a useful purpose to the cabbage growers in this State.

Both in the eastern and in the western sections of this State, there is a well-developed cabbage industry, and in all sections the vegetable is grown for local markets or home use, yet everywhere its culture is hindered by certain insect enemies.

I recommend that it be published as the Bulletin for July, 1911.

Respectfully,

FRANKLIN SHERMAN, JR.,
Entomologist.

TO HON. W. A. GRAHAM,
Commissioner of Agriculture.

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INSECT ENEMIES OF CABBAGE.

BY FRANKLIN SHERMAN, JR., Entomologist.

INTRODUCTION.

The cabbage crop is an important item in North Carolina. Not only is the cabbage grown in all home gardens, but it is an important commercial crop. In the east there is a well-developed industry in the growing of early cabbage for shipment to northern markets—while in the mountain counties of western North Carolina the late cabbage crop is important, and quantities are shipped from Mount Airy, Elkin, Wilkesboro, Lenoir, Asheville, Waynesville, Hendersonville, Brevard, and other points. The fact that it is, generally speaking, a certain and dependable crop, and that it is adapted for growing in rotations and between rows of other crops, in orchards, etc., all combine to make it a favorite. Furthermore, the cultivation which is given to the cabbage leaves the land in most excellent condition for other crops to follow. Hence, regardless of the fact that prices are sometimes unsatisfactory the cabbage crop is now, and will continue to be, a very important one.

But like other crops the cabbage has its enemies. We can not in the nature of things develop a great agricultural industry without at the same time increasing its enemies. These enemies may be what are known as fungous diseases, bacterial diseases, or insect pests.

This bulletin is devoted to a consideration of the *insect* enemies of the cabbage, with brief discussion of some important diseases in the last pages. Along with the discussion of each insect we discuss the remedies which can be used against it, and lest any one remedy should fail or be unavailable to the grower we also mention remedies which have been recommended or used in other States.

Practically all of the insects that attack cabbage also attack other crops that are related to cabbage, such as turnips, cauliflower, kale, mustard and collards.* Hence this bulletin, although written with special reference to cabbage, includes practically all of the insects that are serious pests of these other crops.

CULTURE CONSIDERATIONS.

It is an old saying that "an ounce of prevention is worth a pound of cure." It is often easier to *avoid* trouble than it is to get out of it, and the same rule holds good in regard to some insect pests. It is quite practicable to lessen the amount of injury to the cabbage crop by handling the crop in such a way as to give the least possible encouragement to its insect enemies.

*For the benefit of readers in the western part of the State and others, it may be said that the "collard" is a cabbage-like vegetable with rather long stem, which does not form a head. By many it is preferred to the cabbage. It is more especially a fall and winter vegetable, although can be used from June to April. It is grown for home use throughout the warmer part of the State and corresponding parts of other Southern States.

PROTECTION OF YOUNG PLANTS.—Young cabbage plants in the seed-bed are sometimes riddled with holes by flea beetles, and are therefore in a weakened condition when they are transplanted. If the beds are provided with netting, cheesecloth or other effective screen, much of this will be prevented.

TRAP CROPS.—Among the very earliest plants to grow up in our gardens in spring are mustard and turnips. Both mustard and turnips are subject to the same pests as cabbage, hence if we merely neglect them they become a breeding ground for cabbage worms, terrapin bugs and other pests which will later attack the cabbage in great number. But if we are watchful we may use the mustard and turnips to advantage, for we may leave them undisturbed until they are thoroughly infested with these pests and then we can destroy plants, insects and all by cutting down, adding straw or leaves, and burning; or by spraying with pure kerosene, or by using scalding water. This method of leaving a crop purposely as a bait to entrap insect pests is a good one if you are careful and faithful in carrying it out by destroying the trap crop. But if you neglect to destroy it and let the insects go on undisturbed it will be worse than ever, for you simply increase the number of these pests.

LATE PLANTING.—Of course the man who grows early cabbage must plant his crop early in spring, or the fall before. But it is worth while to remember that injury by cutworms is always worse in spring and early summer, so if you want to set cabbage at that time of the year remember that if set *late* in spring (say in May or June) there is less danger from cutworms than if set earlier.

In this connection it is worth while to notice that the Terrapin Bug (or Harlequin Bug) is more destructive to cabbage that is set out early in the season. Here at Raleigh cabbage and collards set out in spring and early summer often suffer badly from its attacks, but if set out after about the first of August they are often free from serious injury.

DESTRUCTION OF REMNANTS.—When the crop is gathered, what purpose does it serve to leave the old stalks with their ragged outer leaves standing in the field? Yet on these old remnants hundreds of cabbage worms, cabbage lice, terrapin bugs and other pests live, grow, and come to maturity undisturbed. We can therefore gain an important point by removing or destroying *promptly* all remnants of the crop. Even in the case of individual heads which are first cut, it is well to pull out the stem and dispose of it by feeding to stock, rather than to let it remain and breed pests for the other plants around. After the last of the crop is gathered all the remnants on the entire field may be plowed under or gathered and fed to stock.

CLEAN CULTURE.—It is always in order to recommend that a crop be given good cultivation, and that weeds be kept down. There are several cabbage insects which feed naturally on wild weeds, hence by keeping down all such weedy growth less encouragement is given them. Constant and careful cultivation also prevents some injury by cutworms.

REGARDING INSECTS AND THEIR NAMES.

In discussing the cabbage insects in this bulletin we have given both the popular and the scientific name of the species, and have indicated the *order* and the *family* of insects to which each belongs. It should be remembered that the *order* is the most comprehensive group, and each order is divided into a number of *families*.

The great majority of our common insects may be grouped into seven orders, as follows:

1. The ORTHOPTERA (Or-thop'-tera), including the grasshoppers, katydids, crickets, roaches, etc.
2. HEMIPTERA (He-mip'-tera), bugs, such as chinch bug, terrapin bug, lice, scale insects, plant lice, etc.
3. NEUROPTERA (Neu-rop'-tera), lacewing flies, dobsons, dragonflies, Mayflies, darning needle, mosquito hawks, etc.
4. LEPIDOPTERA (Lep-i-dop'-tera), butterflies, skippers and moths.
5. DIPTERA (Dip'-tera), the true two-winged flies, such as houseflies, mosquitoes, blowflies, horseflies, etc.
6. COLEOPTERA (Co-le-op'-tera), beetles, such as potato beetle, bill beetle, flea beetle, June beetle, tumble beetle, tiger beetle, etc.
7. HYMENOPTERA (Hy-men-op'-tera), bees, ants, and wasps.

It is believed that this explanation and arrangement will be helpful to those who are interested in learning how to recognize the different orders of insects.

CABBAGE INSECTS.

Although there is quite a list of insects which attack cabbage to more or less extent, yet the great bulk of damage in North Carolina is done by cabbage louse, cutworms, terrapin bug and cabbage worms (of which there are several different kinds). Less important injury is done by flea beetles, cabbage maggot and fall army worm.

THE CABBAGE LOUSE

(*Aphis brassicae*.)

Order Hemiptera, Family Aphididae.

(Also called Turnip Louse, Collard Louse, Mustard Louse, etc.)

DESCRIPTION.—A grayish or greenish plant louse not over one-eighth inch long which infests cabbage in great numbers, sucking the sap from the plant and causing it to wilt down and die.

INJURY IN NORTH CAROLINA.—The cabbage louse is one of the most serious insect enemies of cabbage in North Carolina, standing with the harlequin bug and cabbage worms as the three worst pests of the crop. When conditions favor it, the louse appears on the plants in tremendous numbers, often massed together so thickly that they are piled over each other, each louse being able only to reach the plant with its beak which is thrust into the leaf or stem. It is more destructive in the eastern and central sections than in the west. It may be found on cabbage at any time of year and most published accounts state that it is most destructive in late summer and fall. However, the great majority of the complaints that have come to this office (and there have been

many) have been in late winter and early spring, over half of all complaints having been in the months of March, April and May. This is also in accord with our observations. Of course when it attacks the late crop its injuries must be in summer and fall.

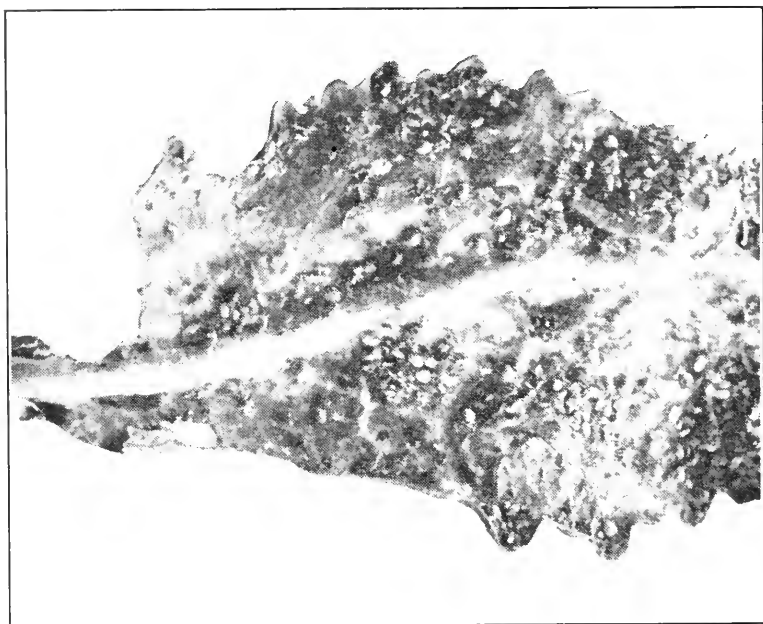


FIG. 1.—Cabbage Louse. Showing how thickly the lice infest the lower surface of the leaves. Slightly enlarged. (Photo by Z. P. Metcalf.)

DISTRIBUTION.—The cabbage louse seems to have a wide range. It is destructive certainly throughout all of eastern and middle North Carolina and probably throughout the western part of the State also, though we have had fewer complaints from that section. Bulletins from Kentucky and Michigan indicate that it is destructive in both of those States, and it is the most important enemy of turnips in Ontario, Canada. There is little doubt that it is present throughout the farming regions of the United States and Canada, for the Yearbooks of the U. S. Department of Agriculture for 1907 and 1908 mention the following places where injurious outbreaks occurred: Wyoming, New Mexico, California, Pennsylvania, Virginia, Florida, Texas, New York, New Jersey, Ohio, and Canada. Our growers can see therefore that this is not merely a temporary pest which will abide for a time and then disappear, but it is a widely distributed and permanently established pest, although it is worse in some years than others and in certain seasons does not do serious injury.

LIFE HISTORY, HABITS, ETC.—This insect, like all other plant lice, takes its food by sucking the sap from the plant, its mouth being formed into

a small pointed beak by means of which the stem or leaf is pierced, and the sap is then withdrawn. Cabbage are not "eaten up" by the cabbage louse, they are rather *sucked to death*, and the difference is important, as is shown in the discussion of remedies.

The louse attacks many different kinds of plants related to cabbage, records in this office showing complaint of its injuries to collard, rutabaga, radish, and turnip. It is commonly seen on mustard in spring. It will no doubt attack kale and cauliflower just as readily.

The breeding habits of the cabbage louse are interesting, and in this it is like many other kinds of plant lice. In the first place let it be understood that *the cabbage louse is always a louse*, it never is a butterfly, or a worm, or a caterpillar, and no kind of moth or butterfly lays eggs to make lice. The full grown cabbage louse is never more than about one-eighth inch long, and it may be either winged or wingless. All through spring and summer the full grown females (whether winged or not) give birth to living young, and the young lice are in all appearances similar to the old ones except that they are smaller and are of course without wings. But in the fall there is a generation of full grown females which may develop eggs, and these eggs may pass the winter. The writer is not sure that all these details have been fully worked out in the Southern States. Personally he is inclined to believe that the grown lice and young lice, too, may pass our mild winters alive on the plants. At any rate all ages of living lice are to be found in great numbers on the plants in late winter and early spring.

The wingless lice can of course move only for short distances and can not spread the species very widely, but by being confined to the one plant on which they grow they do certainly result in very bad infestation of those plants. But when a plant is crowded the winged ones can fly away to new plants and there start new colonies and work new damage. Indeed, when a plant becomes crowded it seems as if a greater number do develop wings, so that nature thus enables them to escape starvation.

NATURAL ENEMIES.—There are a number of other insects which attack and kill the cabbage louse, and they are to that extent helpful to the cabbage grower, and are deserving of such protection and encouragement as he can give.

If one will closely examine plants which are infested he will sometimes find among the healthy, active lice a considerable number that are dead, dried and bloated in appearance. A few such can be found in Figure 1. Some of these will have a little hole cut in the body, usually on the back. These lice have been *parasitized*, that is they were stung by a tiny little four-winged insect not unlike a wasp or bee, but so small that it could grow to its full size inside the body of the louse. When this little insect stung the louse, it laid an egg in the skin or body of the louse. That egg hatched to a tiny maggot or grub which lived *inside the body of the louse*. As it grew to maturity the louse sickened and died and the body swelled up as described. Then the maggot went through its changes to a little four-winged insect (like that which first stung the louse), it cut its way out through the back of the louse, and

flew away to find a mate and then do its share in stinging other lice. An insect which grows to its maturity inside the body of another in this way is known as a true internal *parasite*, and the insect which falls victim to it is a *parasitized insect*. One may find many parasitized lice on cabbage and other crops.

Among the colonies of cabbage lice one may often find some small beetles of yellowish color with black spots and markings. These are "Lady beetles" and they are there for the purpose of eating the lice, so they are beneficial and should be given encouragement. The lady beetles lay eggs which hatch to little bluish colored worms (larvæ) with yellow spots,—these little worms (larvæ) have legs and are quite active, running about over the cabbage and eating a great many of the lice. There are several distinct kinds of lady beetles that devour the cabbage louse.

Also one may find among the cabbage lice small worms, more or less snail-like in shape, which do not have legs. These are larger at the tail end and when feeding they swing the pointed head end about from side to side. When this pointed head end strikes a louse the louse is seized by a pair of very small pointed jaws and held fast while the worm sucks the louse dry and then the empty skin is cast off. Often the worm remains motionless for a long time. These worms are the maggot stage (larvæ) of what are known as "Syrphus Flies," and they are beneficial in that they destroy the cabbage louse. The adult parent *Syrphus* flies are yellow-and-black, two-winged flies and are often seen on flowers or hovering in the air near them.

So far as we know there are no other important enemies of the cabbage louse. Parasites, lady beetles and the *Syrphus* flies are their principal natural enemies. While we should know of these helpful insects and should encourage them all we can, yet we must not depend on them, for while they do perhaps prevent the lice from becoming as destructive as they otherwise would, yet when the lice are once present in great numbers, these natural enemies are not sufficient to prevent damage.

REMEDIES.

There are several different remedies that can be used against the cabbage louse, as well as several methods of prevention.

PREVENTIVE MEASURES.—In the first place the louse will be less likely to become destructive if all weeds are kept down, especially such weeds or seeding plants as are related to cabbage. Do not allow mustard or turnip plants to grow up or go to seed in the spring near the cabbage, as they give a harboring place for lice. Then again, remember that the lice may be on the rough outer leaves that are left on the stem when the head is cut for market, so it is important to destroy all remnants as fast as the heads are cut. These measures will help to keep the lice from becoming numerous.

SOAP SOLUTION.—In our own experience this is the best and most practical remedy for the cabbage louse. We have used it with entire satisfaction, prepared in this way: Take any ordinary brand of laundry (or home made) soap, shave it into thin pieces in water at the rate of

one pound to two gallons water. Put this over fire and bring to a boil and then stir, which will cause the soap to dissolve in the hot water. Now remove from the fire and pour in two gallons of cold water, and it is ready to use. This gives one pound of soap to four gallons of water, and will be fatal to all lice that are wetted by it. It is best applied with a spray pump. As many of the lice will be hidden in wrinkles of the leaves or on the under sides of the leaves it is not easy to reach them all. It is a great advantage to have a boy (barefooted and with sleeves rolled up), go along with the man who is doing the spraying, to turn the leaves quickly from side to side, open and close, etc., so that every inch of surface of every leaf will be reached by the spray. The work can be done *thoroughly* and *rapidly* in this way. It is not nearly so difficult as it may sound from this description. Many persons in this State have used this cheap and simple remedy as result of our recommendations and almost without exception they report good results.

Prof. R. I. Smith, Entomologist of the North Carolina Experiment Station, says:* "It is surprising how easy the cabbage lice may be killed with soap solution. Ordinary strong potash washing soap, or powder, will do the work. Dissolve one pound in about four gallons of water and apply to infested plants with considerable force and in liberal quantities. The lice are often so thickly massed together that those underneath will escape unless the solution is applied as a fine spray and with *force*. A spray pump is quite necessary and should be provided with a short hose and extension rod with a curved end, in order to throw the spray on the under side of the leaves. Failing in this, the leaves must be turned over and the colonies of lice saturated. *Simply sprinkling the tops of infested plants does very little good.*"

All of which is quite in accord with our experience and strengthens the recommendations already made.

OTHER REMEDIES.—Kerosene emulsion at strengths of 10 to 15 per cent oil has been recommended in some other States. Full directions for preparing this are given on page 40. In some experiments which we conducted at Raleigh in 1904, the emulsion at strength of 10 per cent oil did not kill the lice as well as the soap solution already described, while at 15 per cent oil, which did not kill the lice quite satisfactorily, there was a noticeable though not serious scorching of the leaves after a few hours of warm sunshine. A spray solution of whale oil soap has been suggested, but we do not know as the exact proportions have been worked out.

In 1905 a gentleman in Rutherford County reported that he had good success in this way. He filled a barrel with wood ashes and poured in water until it leached through at the bottom. This water had enough lye so that when sprinkled or sprayed on the plants it was fatal to the lice.

From all this discussion of remedies the reader can see that the control of the cabbage louse is neither expensive nor difficult. The two main points are, that it is killed by using solutions of soap, lye, or oil, and that the application must be very thorough.

*Bulletin 197, N. C. Exp. Sta., p. 18.

It is utterly useless to try to poison the cabbage louse (or any of the plant lice for that matter) with Paris green. The louse simply *can not* eat the Paris green even if it tried to do so. It is a *sucking* insect.

CUTWORMS.

(Several Species.)

Order *Lepidoptera*, Family *Noctuidæ*.

DESCRIPTION.—Rather stout-bodied, soft, brown, blackish or grayish caterpillars, which remain concealed during the day and do damage at night by eating off young plants at or near the surface of the ground.

INJURY IN NORTH CAROLINA.—Cutworms are a common pest everywhere on all kinds of transplanted crops as well as cotton, corn and others. Cabbage suffers badly from their attacks, especially in the spring; and they are more severe in their injuries during the cool spells after they once become active.

DISTRIBUTION.—Cutworms are destructive in all sections, and there are a number of different kinds of them. The exact species of cutworms in North Carolina might not be the same as in some other States, yet "cutworms" are a common nuisance everywhere, and every bulletin on garden insects, whether from east or west, north or south, United States or Canada, makes mention of these pests.

LIFE HISTORY.—All our species of cutworms are the caterpillar (larvæ) stage of certain kinds of night-flying moths or "millers." The adult parent moths are usually brown or grayish in color (with hind wings lighter) and measure from 1 to 2 inches from tip to tip when the wings are spread. These moths begin to appear in early summer,



FIG. 2.—Granulated Cutworm, one of our most destructive species. Showing the cutworm extended and curled up. About natural size. (Photo by Z. P. Metcalf.)

in late May and June, and continue to be common until November. The moths lay their eggs mostly in grassy or weedy places, and these eggs hatch to tiny little cutworms which feed on the grasses or weeds. Many of them pass the winter in these grassy and weedy lands in a half-grown condition and when spring opens they are hungry for food to complete their growth. It is at this time that they are the most troublesome. They usually feed at night, but they may do damage in the daytime, especially if it is cloudy. During the day they usually remain hidden under trash, rubbish or clods, or burrow in the

earth. Sometimes they climb up the stem of a plant and feed on the leaves. Their damage to cabbage consists in eating off the young plants at the ground. Sometimes they pull the severed end of the young stalk into the ground where they may feed on it the following day.

When the larva (or cutworm) becomes grown (which varies according as the moth is to emerge in spring and fall) it changes to the *pupa* stage in the earth, an inch or so under the surface. The great majority



FIG. 3.—Pupa of the Granulated Cutworm. About natural size. (After Z. P. Metcalf.)

of cutworms that do damage in spring change to the pupa state in May (or about) and it is because they have matured and changed that they cease their injuries, and not on account of any epidemic of disease among them as some seem to think. The *pupa* is a sort of spindle-shaped object, brown in color, and in this stage the insect does not move about nor take food, it is simply going through the change from the cutworm to the parent moth. After about two weeks the adult moth breaks out from the pupa shell and after hardening and drying like a young chick just out of the egg, it is ready for an active flying life. The life of the adult moth is short, probably only a week or two to allow for mating and laying of eggs. The moths are often attracted to bright

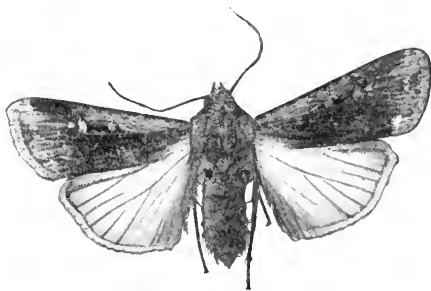


FIG. 4.—Adult moth of the Granulated Cutworm. Slightly enlarged. (Photo by Z. P. Metcalf.)

lights, and not infrequently they enter houses and flutter about the lamps or walls. The flying moth does not develop to any other form, but dies soon after eggs are laid.

NATURAL ENEMIES.—Almost every kind of insect is subject to the attacks of other insects, larger animals, or diseases, and fortunately for us cutworms are not exceptions to this rule. Among birds the insect eating kinds which spend much time on the ground are the most useful, especially the bob white, crow, black birds, meadow lark, sparrows, cat bird, mocking bird, etc. These, in the course of a season, and especially when rearing their young, pick up many a juicy cutworm. The common and much despised toad is also a helper, for he comes forth from his hiding place at dusk, and cutworms are one of the

regular items in his bill of fare. Certain predaceous insects like the ground beetles also attack and devour cutworms. Parasitic flies sting and deposit their eggs within the bodies of cutworms, and these eggs, hatching to maggots, eventually cause the death of the cutworm. There are also certain fungous and bacterial diseases which kill a considerable number.

These natural enemies, while not by any means preventing all damage by cutworms, at least act as a check upon them, and we believe it proper that the reader should know of them.

REMEDIES.

PREVENTIVE MEASURES.—As the eggs are laid in weedy and grassy lands, we can see at once that cabbage planted immediately after a growth of sod and weeds will almost surely suffer, as the cutworms are already in the soil. Therefore it is a good plan to have cabbage come after some cultivated crop. If cabbage must be planted after a crop of grass or weeds then the injury will be lessened by plowing as long in advance as possible and cultivating the ground several times before setting out the plants. In the spring setting of cabbage plants it should be remembered that those set early will be damaged most, and those set later will suffer less.

POISONED BRAN MASH.—This is one of the most commonly recommended remedies. It is made in several different ways; the main idea is

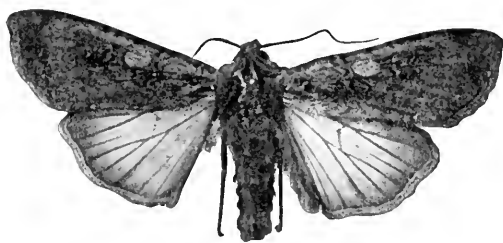


FIG. 5—Adult Moth of the Variegated Cutworm, one of our most destructive species.
(Photo by Z. P. Metcalf.)

to have a sweet, poisoned mixture of which wheat bran forms the bulk. This is one way to make it: Sprinkle one ounce of Paris green into two pounds of wheat bran, and mix thoroughly. Then mix water and molasses together to make a thin sweet liquid and add enough to the bran to make a thick mash. This makes a mixture which has bulk and body enough to be easily handled, it is sweet enough to be attractive to the cutworms, yet is poisonous and fatal to them. The mash should be thick enough so that it can be squeezed together in the hand. This is distributed through the cabbage bed or field, *before the cabbage plants are set out*, while the ground is yet bare, and the cutworms, being at that time without other food in the soil, will eat this poisoned bait. The mash may be used after the plants are set, but not so effectively. Distribute the mash along the rows where the cab-

bage are to be set in little balls or pellets, and if convenient shade it with a chip or dry leaf so it will not dry out too quickly. One such pellet every yard or two along the rows should be sufficient.

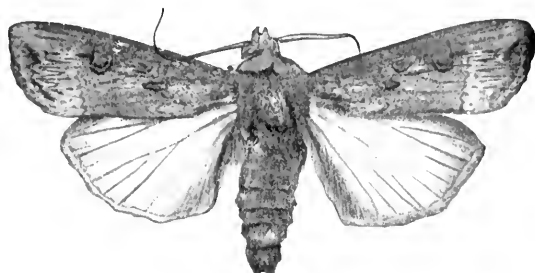


FIG. 6.—Adult moth of the Greasy Cutworm, one of our destructive species. (Photo by Z. P. Metcalf.)

POISONED CLOVER BAIT.—This method is similar to the last in principle, green clover being poisoned and distributed through the field. Cut a sufficient quantity of green clover (crimson clover is excellent) and saturate it in water which is either poisoned with Paris green or arsenate of lead, at the rate of one pound of green (or five pounds of arsenate of lead) to a barrel of water. Fork the clover about in the solution so that every leaf and stem will be submerged and poisoned. Then scatter it through the cabbage patch or field (before the plants are set out), and many of the cutworms will be killed by eating it.

SEARCHING AND KILLING THE CUTWORMS.—Although it might not seem so, yet this is one of the best methods of all, especially for small gardens and patches. One cutworm may cut many young cabbage plants during a few weeks in early spring, yet during the day it will usually remain hidden close to the top of the ground near the last one cut. By going along the rows frequently (every morning if possible) and scratching around the root of every cabbage which has been cut during the night, one may often (though not always) find the guilty worm. Of course this does not save *that plant*, but it may save a good many others not yet cut. The cutworms may be right at the base of the plants, or as much as four or five inches away, but they are large enough and near enough to the surface so that with a very little experience one can usually find them.

PAPER COLLARS.—It may be possible to prevent some cutworm injury by placing paper collars around the plants when setting them out. Cut the paper into strips of convenient width, wrap around the base of the young stalk, and set the plants so that the bottom of the collar is a little below the surface, and the top should come to the first leaves. In large plantings this is not easy, owing to the haste to get the work done, and the varying sizes of the plants. The method is quite frequently used in gardens, especially on tomato plants, and it can be used for cabbage in the same way.

FLEA BEETLES.*(Several Species.)*Order *Coleoptera*, Family *Chrysomelidae*.

DESCRIPTION.—Very small beetles of black or brownish color, often marked with stripes, which eat small holes in the leaves. The hind legs are enlarged and enable the beetle to jump quickly and for considerable distance, hence the name of “flea beetle.”

INJURY.—There has been very little complaint of injury to cabbage by flea beetles in North Carolina, although such injury may be observed in almost any cabbage field, especially in spring. There are several different species of flea beetles of various colors, but the one* most frequently seen on cabbage, turnips and related crops is black with a light colored stripe down each wing cover.

Although the injury by flea beetles is not usually conspicuous it may be serious nevertheless, for even a very small hole in the leaf may cause considerable drying out or loss of sap, and it may also furnish an opportunity for the entrance of fungous diseases.

LIFE HISTORY AND HABITS.—Flea beetles are all closely alike in the general features of their life history. As a rule the adult flea beetle lays its eggs at or near the roots of the plants which they attack, and the grubs (larvæ) which hatch from the eggs feed on the roots below the surface of the soil. With some kinds of flea beetles, however, the larvæ burrow within the leaves of plants. When the grub, or larva, becomes grown it changes to a *pupa*, still in the soil, and in a few weeks this pupa changes to the adult beetle which comes out, jumps about, or flies, feeds on the leaves and lays eggs for another brood. The winter is usually passed in the adult flea beetle stage under rubbish on the ground and like situations.

When feeding or resting on a leaf, a flea beetle always seems to have his legs prepared for a leap into the air. When touched, it leaps so quickly that its motion, together with its small size, causes it to really disappear instantly from sight.

NATURAL ENEMIES.—We know but little about natural enemies of flea beetles. They almost certainly are attacked by some kinds of parasites, and possibly small birds like sparrows would pick a few of them off the cabbage plants, but our information is not very definite or satisfactory.

REMEDIES.

Dusting the plants with lime and Paris green, or applying Paris green as a spray, as recommended for cabbage worms (page 27) should be sufficient to prevent serious damage by flea beetles. Dusting with lime alone, road dust or soot have all been suggested for the control of flea beetles, as they seem to dislike the presence of such substances on the leaves.

On the whole, we do not consider the flea beetle as a serious pest to our cabbage growers.

**Phyllotreta vittat* ♀

THE HARLEQUIN CABBAGE BUG.

(Murgantia histrionica, Hahn.)

Order Hemiptera, Family Pentatomidae.

(Also known by the names: Terrapin Bug, Fire Bug, Cabbage Bug, Collard Bug, Lincolnite, Calico Bug, etc.)

DESCRIPTION.—A black, orange and yellow bug nearly half an inch long and nearly one-fourth inch wide, which attacks cabbage and related plants, sucking the sap and causing the leaves to wilt, turn brown and die.

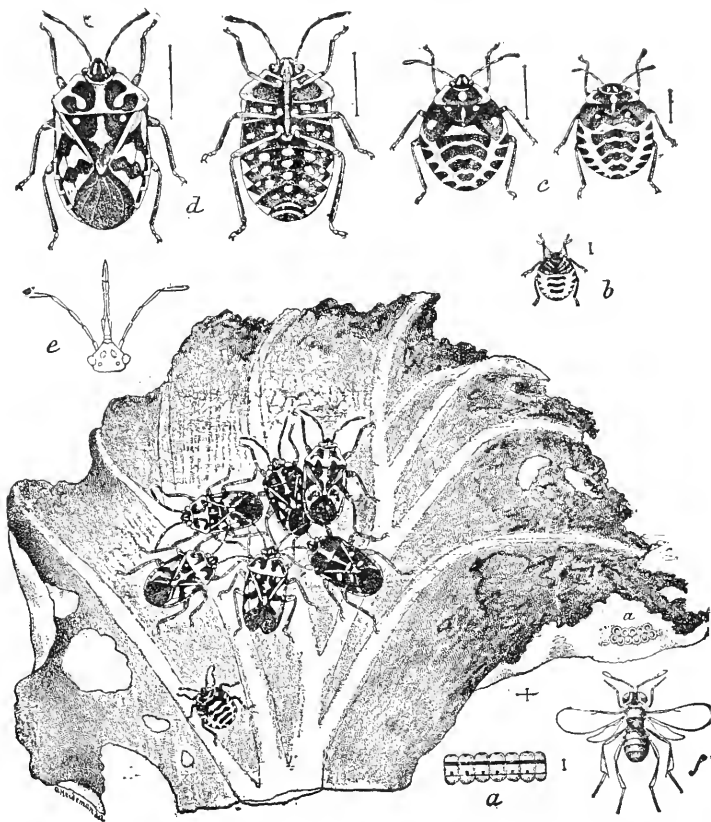


FIG. 7.—Harlequin Cabbage Bug. *a*, Eggs enlarged; *b*, young, enlarged; *c*, young, more enlarged; *d*, adults, seen from above and below, enlarged; *e*, outline of head of adult, enlarged; *f*, parasite, enlarged. Other figures natural size. (Drawing by O. Heideman.)

INJURY IN NORTH CAROLINA.—This is one of the very worst insect enemies of cabbage in this State, standing with cabbage louse and cabbage worms as the three worst pests of the crop. The many reports which we have received show it to be destructive throughout the eastern and central parts of the State, but we have had almost no complaint of it from the mountains.

The insects suck the sap from the plants (do not *eat* the leaves) and cause them to wither and die. Three or four bugs will kill a young plant in a few days.

DISTRIBUTION.—The harlequin cabbage bug is not a native of North Carolina. It is sometimes called the "Lincolnite" because it appeared in some localities about the time of President Lincoln's administration, and some people believe that it is a native of the north and was introduced in supplies sent to troops. As a matter of real fact, it is a native of the far south (perhaps Mexico) and in the United States was first destructive in Texas in 1864. It has pushed northward, however, until now it is recognized as a pest as far north as Long Island and Pennsylvania in the east, southern Illinois, southern Indiana and southern Ohio in the Mississippi valley, and in southern California and Nevada in the west. In recent years its progress northward has been checked, probably because it has gone about as far as it can stand the winters.

Right here we can see the bearing that a study of the distribution of an insect has on its probable destructiveness. From what we know of the distribution of this pest we know that it will likely continue to be a pest throughout eastern and central North Carolina. On the other hand it is not yet a pest in the colder part of our mountain regions, and probably will not become troublesome there for some time yet, until it may gradually acclimate itself. As it is a southern insect we may assume that usually very severe winters will kill out many of them, while in winters which are uniformly mild more of them will live through.

LIFE HISTORY, ETC.—The adult, winged bugs lay eggs on the leaves. These eggs hatch to young bugs, which are much like the grown bugs in general appearance, although they are not so large and do not have wings. The young bugs feed on the leaves and shed the skin (molt) five times, at the last molt attaining the full size and wings. There are several broods or generations each season. The last brood to reach maturity in the fall passes the winter, the bugs seeking such shelter as they can find under rubbish, etc.

Emergence.—The harlequin cabbage bug makes its appearance in spring about April 1st. In 1904 the writer observed the first ones at Raleigh on April 2d, in 1909 he found the first ones of the season at Greensboro on April 7th on seeding turnips, while in 1908 Prof. R. I. Smith,* Entomologist of the North Carolina Experiment Station, first noted it at Raleigh on April 4th. In the eastern and southeastern parts of the State it no doubt appears earlier, farther west perhaps it appears later. At this early season they may often be found grouped in considerable numbers on certain individual plants, especially seeding turnip, collard and mustard. They begin to mate and lay eggs soon after they appear.

Eggs and Egg-laying.—In 1908 Prof. R. I. Smith found the first eggs on April 14, ten days after the bugs were first observed. The

*Professor Smith has done excellent work on the biology of the Harlequin Cabbage Bug, and his work is freely quoted in this account. His paper on "Biological Notes on *Murgantia histrionica*" (Harlequin Cabbage Bug) was published in the *Journal of Economic Entomology*, April, 1909, pp. 108-114.

eggs are usually laid in two rows, each containing six eggs, but one female will lay several such clusters of eggs. They are usually deposited on the under side of the leaf, are pearl gray in color, with black markings, barrel-like in shape and quite hard, so that in pinching hard enough to crush them the leaf is bruised. It seems that nature has

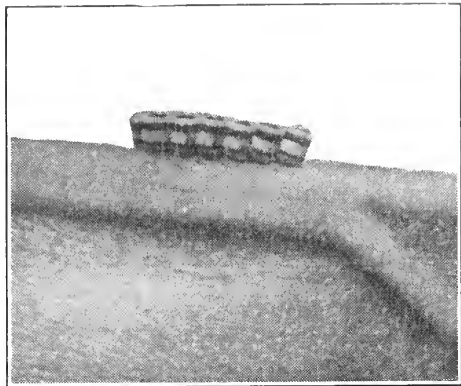


FIG. 8.—Eggs of Harlequin Cabbage Bug. Enlarged. (Photo by Z. P. Metcalf.)

pretty definitely fixed twelve as the normal number of eggs to be laid at a time, as Prof. Smith found that bugs which laid either over or under this number would even up at the next laying, or if they laid more or less than twelve for several times in succession they would die.

Mr. Smith tested the egg-laying powers of fourteen different females which appeared early in spring. Of these one short-lived bug died on April 26, after laying three batches of twelve eggs each. But the prize breeder in this series of tests laid fifteen separate batches of eggs, the first on April 7th, and the last on June 9th, having laid in all a total of 179 eggs. She died the second day after laying the last lot of eggs. Prof. Smith concludes that the average number for these early spring females is about 100 eggs.*

Prof. Smith also attempted to ascertain whether the bugs of the second generation were equally prolific, but found that (at least in the case of the specimens he confined) the mortality was so high that completely satisfactory results could not be obtained. Out of fourteen bugs at the start on August 10, seven died by August 27, after laying from one to three batches of eggs. Three more had died by September 7, having laid only thirty-six eggs each, and another died only a few days later, having laid four batches with a total of forty-six eggs. Of the three that remained one laid six batches with seventy-two eggs, another six batches with a total of seventy-one eggs, and the third laid seven batches with a total of eighty-four eggs. Prof. Smith concludes that while the lesser number of eggs which these second brood bugs laid may have been partly unnatural, yet that they are not so prolific as the ones that pass the winter. He believes that the females of the

*To be exact 99 1-9 eggs.

second brood average from seventy-two to eighty-four eggs each, as against an average of one hundred for the over wintering brood.

The length of time from the laying to the hatching of the eggs varies from ten or eleven days in the spring to only three or four days in warm summer weather.

The Young Bugs or Nymphs.—The young bugs which hatch from the eggs are of somewhat the same general shape as the adult bugs except that they are perhaps a little more flattened, the body is more oval in outline, and the young bug is without wings. These young bugs are known as "Nymphs." When first hatched they are of a greenish color, but later they develop much the same general colors as the parent bugs, though the markings are paler. These Nymphs are active and run about freely from place to place. They feed voraciously by sucking the sap from the plant and do much injury in this way. The skin is shed from time to time to allow for further growth, this being done five separate times in the development of the young bug. In the last stage of its life as a nymph the young bug has evidence of the developing wings in two plainly visible wing-pads on the shoulders, and when the skin is shed for the fifth and last time the wings come out fully developed, and after drying and hardening the insect can fly.

At Washington Mr. F. C. Chittenden found* that it took practically sixty days from the time the bug hatched from the egg to become adult and get wings,—this was with bugs hatched early in the spring. And Prof. Smith at Raleigh, working with bugs hatched in latter part of August found that it took from fifty-seven to sixty-five days. It can be said, therefore, in a general way, that it takes about two months for the young bugs to get grown. All this time they are unable to fly and (unless the plant dies) they are apt to remain on the same plant. One can easily understand how a brood of these young bugs, from six to twelve in number (even if only one egg-mass were laid on the plant), would cause very serious damage during their growth.

While the bug is in this nymph stage the body is softer than is that of the adult bugs, and is not so much protected by the wings. It is while in this softer condition that we have the best opportunity to combat them by spraying as will be explained later under head of Remedies.

The Adult Bugs.—The adult stage has already been mentioned and is quite well known to persons who have the pest to deal with. The adult bug has fully developed wings; is black, yellow and orange in color, and the body is widest at the shoulders. These adult bugs also feed on the plants but not so actively as the nymphs.

FOOD PLANTS AND HABITS.—The Harlequin Bug feeds on most plants of the cabbage family and has been recorded on a number of others. Mr. Chittenden mentions them as having attacked potatoes, unripe fruit of egg-plant, the pods of okra (sometimes called "gumbo") and beans, beets and asparagus. It should be remembered that it is pre-eminently and primarily a pest of the cabbage and related plants, and seems to attack these others only when its more natural food is lacking.

*Circular 103, Bureau of Entomology, "The Harlequin Cabbage Bug," p. 5.

The Harlequin Bug sucks the sap from the plant, it does not *eat* the leaves. It is evident, therefore, that a poison like paris green (which remains on the surface of the leaves), is of no use whatever as a remedy for it. The farmer might literally cover the surface of the leaf with a layer of paris green and yet this pest (by thrusting its beak through *into* the plant and sucking out the sap), would still thrive as if no effort had been made to check it. In fact, it could not eat paris green even if it wanted to. Like the cabbage louse, it is a *sucking* insect.

NATURAL ENEMIES.—Many kinds of injurious insects are preyed upon by birds, moles, toads, or even by other insects, but the Harlequin Bug has very few such enemies, and this is probably because of a peculiar odor and taste, for it belong to the "stink bug" family of insects (Order *Hemiptera*, Family *Pentatomidae*), many of which possess extremely strong and nauseating odors. Nevertheless the English sparrow seems to destroy some of the Harlequin Bugs. At Red Springs, in Robeson County, Mr. W. M. Roberts says that the English sparrow is quite an efficient aid in keeping it in check, and that in consequence the damage by the bug is often not serious. Others have made mention of this same useful habit of the English sparrow. But as a rule the Harlequin Bug is fairly exempt from enemies.

But while the insects themselves are thus comparatively free from attack, the eggs are not. There is a very small, black, four-winged insect, more or less similar to a very small wasp, which lays its eggs within the eggs of the Harlequin Bug. This is shown in Fig. 7. The egg of this little insect hatches to a grub, which comes to full maturity inside the egg of the Harlequin Bug,—when matured this little grub emerges as a tiny four-winged fly like that which laid the egg. This tiny insect is therefore a *parasite* in the egg of the Harlequin Bug, and is known as an *egg-parasite*. Sometimes these are abundant enough to do real good. In 1903 the writer bred parasites from a small lot of eggs indicating a parasitism of not less than 33 per cent. At other times they are so scarce as to be of no real importance.

The young bugs are sometimes attacked by what is known as the "wheel bug," according to Mr. Chittenden, but the good done by these is not great. By far the most useful natural enemy is the egg-parasite already referred to.

REMEDIES.

We have seen that the Harlequin Bug sucks the sap from the plant which it attacks, and that therefore poisons like Paris green are useless against it. There seems also to be only limited opportunity for the use of the contact insecticides like kerosene emulsion, and we are therefore forced to depend largely on indirect methods of preventing their appearance, or tedious labor after they appear.

TRAP CROPS.—The proper use of trap crops constitutes one of the best methods for the grower who wishes to raise early cabbage and collards. A few rows of early mustard may be sown between where the rows of cabbages or collards are to be set. This will get an early start and will be large enough to attract the bugs before the cabbage is set, and as the

bugs will take to the mustard by preference, they will congregate in great numbers. When ready to set out the cabbages, cover the mustard with straw and burn, bugs and all. If this is not convenient, spray thoroughly with pure kerosene, which will kill both the plants and insects, or knock them off into pans with kerosene. By thus killing off the early bugs before they have an opportunity to lay eggs on the cabbage, you may raise your crop in comparative safety, for while there will no doubt be a good number of bugs to appear, they will not be so abundant but that they can easily be kept in control by hand-picking.

In the spring the bugs may usually be found first upon seeding turnips, which grow up about the garden, and at this season they have the habit of congregating together, many on the same plant, instead of scattering about. This makes it very easy to gather and destroy them. But it must be remembered that this work must be done *early in the season, before they get on the cabbage*.

HAND-PICKING.—This method consists simply in picking the insects off the plants by hand, or knocking them off into pans containing tar or kerosene. It is about the only method now employed in this State, but as it is generally practiced it is *far more troublesome* and *far less effective* than it will be if the following suggestions are observed:

1. The work of gathering and destroying the insects should begin *early in the season*, before they become numerous, so that the work shall not be so tedious, and also so as to kill off the early broods.
2. It should also be done *early* in the day, as it is then cooler and more comfortable to do the work and also the bugs are then stiff from the chill of the night, and are more easily caught.
3. All through the early part of the season search should be made for the eggs on the underside of the leaves as well as the bugs, and all eggs found should be crushed.
4. The work of controlling the bugs by hand-picking will be much easier if used in conjunction with the other methods here recommended.

SPRAYING WITH KEROSENE EMULSION.—The young bugs (nymphs) can be killed by spraying with kerosene emulsion. (See p. 40). For this purpose either 10 per cent or 15 per cent oil may be used, the weaker strength being preferable for the very young bugs and the stronger if many of the bugs are advanced in growth. Care must be used in preparing the emulsion to thoroughly mix the oil and the water. In spring of 1904 when using emulsion for cabbage lice, we noticed a slight injury to the leaves from 15 per cent oil, but not enough to do serious damage. Prof. Smith found it effectual in dealing with the young bugs, and says: "When used liberally a 15 per cent emulsion will kill all the young and nearly mature nymphs that it comes in contact with, and will kill some adult bugs. Before the wings are developed the bugs are not so difficult to kill. When spraying with emulsion, many bugs drop from the plants to the ground, and should be thoroughly saturated where they lie, and this is quite important as very few will live to return to the plants. Kerosene emulsion must be properly prepared so that the oil does not readily separate, otherwise the plants may be injured by the spray. Two or three sprayings at intervals of

five or six days should nearly exterminate the bugs, even on badly infested crops." Prof. Smith also makes the point that special effort should be made to kill as many as possible in the fall as he finds that the bugs which pass through the winter are more prolific than the broods that are developed during the summer. Directions for preparing kerosene emulsion are given on page 40.

CLEAN CULTURE.—All the studies that have been made of this insect point to the importance of clean culture as one of the means of control. The insect passes the winter under rubbish, trash, etc., hence the less there is of such material the fewer bugs there will be on the premises in spring. They feed and breed to a considerable extent on seeding mustard, kale, turnips, etc., in early spring, hence if these remnants and useless plants are destroyed there will be less encouragement for them. They may subsist on the rough outer leaves of cabbage after the solid head has been cut out, and this indicates that all remnants should be carefully and promptly removed.

It is to be remembered, however, that such crops as seeding mustard, kale and turnips may be useful as a trap to gather the bugs where they may be killed, so that in the campaign of cleanliness a certain few may be left or even planted for this purpose. But be careful to destroy them, together with the insects, at the proper time. Dr. John B. Smith, in New Jersey, also calls attention to the possible use of a rubbish pile as a trap. He says: "It is good policy, however, while keeping everything in general as clean as possible, to leave somewhere a heap or two of loose rubbish to attract insects seeking winter quarters. These can be destroyed during the winter by burning. The land should be kept as free as possible of weeds, particularly those of the cruciferous (cabbage) family."

TIME OF PLANTING.—Careful observation in any community may show that a time can be selected for planting so that this pest will not be so destructive. A gentleman at Raleigh asserts that the one year in which his collards were practically wiped out by the Harlequin Bug the plants were set early. His experience indicates that collards and cabbages planted after about the first of August are not so much injured. A gentleman in Franklin County, after being advised on this point, said that he had come to rely chiefly on late planting as a means of dodging the pest. Yet in other localities we have seen fall cabbage badly hurt by the bugs, and the farmer who grows *early* cabbage must plant his crop early. The question of changing the time of planting so as to dodge the insect is largely a local one and will vary for different sections and different crops, but it can often be used to advantage.

FALL AND EARLY SPRING WORK IMPORTANT.—Prof. R. I. Smith, of the A. & M. College, at West Raleigh, came to the conclusion that thorough work in late fall and very early spring were especially important. This is because the bugs which mature in fall and pass the winter are much the most prolific in reproducing their kind. He finds that bugs which mature earlier than about September 1st do not usually pass the winter. Hence if unceasing work be done to kill off those that

reach maturity after about September 1st, there will be comparatively few left to pass the winter. And if in the spring careful work be done against the first bugs that come out *before they lay their eggs* great good will result, as these over-wintered bugs lay many more eggs than the later broods. Bear in mind, *it is the bugs that pass the winter* that appear to have the greatest power for harm. *Kill them off before winter comes, give them no place to hide in, and use every effort to kill off such as do appear in spring before they lay their eggs.*

CABBAGE WORMS.

(Several Species.)

Order *Lepidoptera*.

DESCRIPTION.—Green or grayish “worms” or caterpillars which feed on the leaves of cabbage and related plants, eating irregular holes or sometimes stripping the leaves entirely, leaving only the midrib and larger veins.

SEVERAL KINDS OF CABBAGE WORMS.—The reader should understand that there are several different and distinct *kinds* of cabbage worms,—all of them, however, are the larvæ (or caterpillar stage) of moths or butterflies. The one kind of which most complaint is made in North Carolina is the imported cabbage worm, and the second in importance is the cabbage looper.

All told there are no less than five different insects which go under the name of “Cabbage Worms”; they are:

Imported Cabbage Worm (*Pontia rapæ*.)

Cabbage Looper (*Autographa brassica*.)

Native Cabbage Worm (*Pontia protodice*.)

Cabbage Web-worm (*Heilula undalis*.)

Diamond-back Moth (*Plutella maculipennis*.)

INJURY IN NORTH CAROLINA.—Over the State as a whole the cabbage worms take rank along with the Cabbage Louse and the Harlequin Bug as the three most serious insect pests of the cabbage, and perhaps the worms do a greater total damage than any other. In the western part of this State the cabbage worms are the greatest enemy to cabbage culture, and they are perhaps the only insects that give serious concern to cabbage growers in that section, their injuries being so great as to completely overshadow all others. It is not unusual to see field after field in which every cabbage has ragged leaves, and upon examination several different worms are found, the imported cabbage worm seeming, however, to be the chief offender. It is true that the farmer sells the crop by the hundred-weight, and as only the solid head is sold, the cabbage as it reaches the final market does not show the extent of injury in the field. But the grower may rest assured that a plant with riddled leaves can not possibly mature as heavy a head as if the leaves were not injured. It is not only a question of the weight that the worms actually consume; the damage to the plant through loss of sap, drying out, and the rotting of leaves, heads and stems that are attacked, is a very considerable item. In the eastern part of the State where chief

attention is devoted to early spring cabbage the losses from cabbage worms are not so severe as in the west, although by no means insignificant.

Let us briefly consider each of these kinds of cabbage worms.

IMPORTED CABBAGE WORM.

(*Pontia rapæ*.)

Order *Lepidoptera*, Family *Pieridae*.

PARENT INSECT OR BUTTERFLY.—The adult parent insect is a white butterfly with black markings on the wings. In the male there is a black spot just beyond the middle of each front wing (besides the black tip), while in the female there are two black spots (besides the black tip). When spread the wings measure about one and one-half inches from tip to tip.

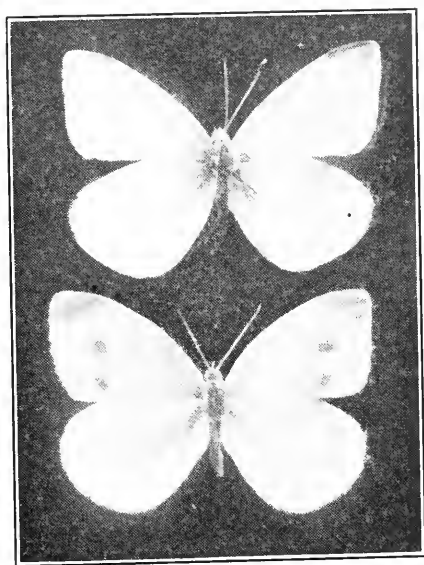


FIG. 9.—Adult butterflies of the Imported Cabbage Worm. Male above, female below. Natural size. (Photo by Z. P. Metcalf.)

HISTORICAL.—This insect is not a native of this country; it was introduced from Europe into Canada about 1860, probably on passenger steamships which carried cabbage in the supplies. It seems to have also been introduced at New York about 1868, and within a year had spread for several miles about, and within about three years spread across New Jersey, and within four or five years more it had spread into all the eastern states, including North Carolina. It was introduced at Charleston (very likely by boat shipments from the north) in 1873, a few years earlier than it would have reached there by its own natural spread.

LIFE HISTORY, ETC.—The butterflies appear in very early spring and lay the yellow eggs on cabbage and related plants. The eggs hatch to small green “worms” with velvety skin, which lie flat on the surface of the leaf. When grown the worm or caterpillar is about an inch long



FIG. 10.—Larva (or worm) of imported Cabbage Worm on cabbage leaf. Natural size. (Photo by Z. P. Metcalf.)

and it then changes to the “chrysalis,” or pupa, and from this the adult butterfly emerges after a few weeks. There are a number of broods each season, and the last brood of worms to reach maturity in the fall change to the chrysalis state and remain in that condition over winter, emerging as butterflies in the spring. The chrysalis is not enclosed in a web or cocoon, but is entirely naked and is usually suspended from the under side of a leaf, stone, fence-rail or other object by a loop of thread around the body. The butterflies are very conspicuous everywhere all through the season—the small *white* butterflies seen fluttering about cabbage are almost invariably of this species. There are several kinds of yellowish butterflies of about the same size that are sometimes seen in our gardens, but which have no connection with the cabbage worms.

NATURAL ENEMIES.—The imported cabbage worm is destroyed by a number of natural enemies. Here, again, the English sparrow comes in for some good work, as he has been observed to pick off worms from cabbage in gardens. Indeed, this bird seems to be fond of staying among the cabbage rows, and almost certainly it does really good work (especially in town and village gardens) in destroying cabbage lice, harlequin bugs and cabbage worms.

Dr. Chittenden says,* “The most important of its insect enemies are small parasites, all introductions from Europe. One of them was purposely imported from England in 1883 and during the autumn of 1904 held the host (cabbage worm) under complete control at Washington, D. C., killing every ‘worm’ which came under the writer’s observation.”

*Circular No. 60, Bureau of Entomology, U. S. Dept. Agr.

In North Carolina, many growers have observed and spoken of the good work done by wasps in destroying cabbage worms, and there are several other predaceous insects that feed on them. One may also frequently find cabbage worms which are sluggish, dying or dead from fungous or bacterial disease. Sometimes dead worms may be found in which the whole body has become softened by internal decay. One such dead worm may infect many others near it. All these enemies of the worms that help to hold them in check are worth knowing about. In some years their work is very efficient, and in all years they keep the worms from being as destructive as they would otherwise be.

REMEDIES.

(See what is said about "Using poisons on cabbage," beginning on page 37).

PARIS GREEN.—In the writer's rather limited experience, he has found Paris green to be an excellent remedy for cabbage worms, and he has used it freely in his own garden and eaten the cabbage afterwards, with no harmful results whatever. The method used was to mix *one ounce* of dry paris green with *one pound* of dry, air-slaked lime. The two are stirred together until the whole mass is one even uniform shade of color, with no spots or streaks of green. This is then tied into a *thin* cloth sack, and by shaking over the heads enough of the mixture sifts through the thin cloth and settles on the leaves to furnish adequate protection. It is only necessary to use just enough to give a light dusty coating over the leaves. It may be applied at any time in the day, either when the plants are wet with dew or not, but the writer has usually applied it in the afternoon when the plants were dry. Wind and rain will remove the application in from one to three weeks, so that several treatments are needed. It should be used soon after the plants are first set out and repeated as often as occasion requires, until the heads are half formed, or a little later if needed. But it is well not to apply the material within three weeks of the time the heads are to be cut.

In October, 1908, we made a practical test of this remedy in a large patch of collards at Raleigh. Mr. Z. P. McCall, Assistant Entomologist, carried out the test under instructions of the writer. In treating 460 collard plants only one and one-fourth pounds were used (this contained *only one and one-fourth ounces* of paris green). Within two days there were noticeably less worms on the treated plants than on untreated ones, and there were many dead worms on the ground. At the same time a lot of worms were placed on treated plants and watched in the laboratory, and all died within a few days.

In August, 1908, the writer advocated the use of this remedy at the Farmers' Institute, at Brevard, Transylvania County, and in September received a letter from Mr. John S. Boggs, R. F. D. No. 2, Brevard, saying: "I have been using your Paris green and lime mixture on my cabbage, and it *does the work*."

All of our experience has been with dry applications, and these are so simple, inexpensive and easy to make that it leaves little to be desired.

Mr. Chittenden,* however, prefers to use the Paris green as a spray in water. He says: "It may be applied either dry or wet, preferably, however, as a spray, at the rate of about one pound to 150 gallons of water. It should be applied when the plants are first set out so as to insure the poison reaching the young larvæ before they have burrowed far into the heads. Other applications should follow as required. These can be made with absolute safety until the heads are about half formed and, for that matter even later, as the poison disappears from plants almost completely within three or four weeks after application."

CONTACT REMEDIES.—A considerable number of substances have been recommended for applying to the plants so as to actually come in contact with the worms, such as hot water applied with a sprinkler, strong soap solution such as is mentioned for cabbage louse on page 10, an emulsion of kerosene containing 10 per cent of oil (directions on p. 40), and dusting with air-slaked lime or sifted ashes. No doubt all of these have some good effect, and at least some of them are so simple as to be available to everyone.

BRAN MASH.—Mix one ounce of Paris green with two pounds of bran (wheat bran perhaps best). Mix in enough sugar to give some sweetening. It may then be sprinkled on dry, or if preferred, water may be added and the mixture applied wet. The worms are attracted by the odor and taste and are killed by the poison. (Page 40).

HAND-PICKING.—In small cabbage patches the worms may easily be kept down by looking over the plants occasionally and picking off all worms that are seen, crushing them under foot or between the fingers. The worms are easily crushed by slight pressure, a quick firm twist between the thumb and forefinger being sufficient. Crushing under foot is much slower. The finger method is perfectly simple, and quite rapid. The worms are harmless to persons, and any objection to the method is quickly overcome with a little practical experience.

DESTRUCTION OF REMNANTS.—Cabbage worms may come to maturity on the old leaves left on the stems when the head has been cut. It is therefore desirable to destroy all such remnants as promptly as possible.

SUGGESTED REMEDIES.—It has been suggested that ordinary corn meal sprinkled into the heads protects them from worms. We have never tried it, and do not know of definite experiences.

Upon two or three occasions persons in North Carolina have told the writer that cottonseed meal is a good remedy. It is said that it should be dusted on in evening or early morning, and that the dew forms it into a paste. The worms in feeding on it or in crawling about, get this paste on their bodies and the sunshine afterwards hardens it, thus practically baking the worms in the dry paste. We have not tried this, and doubt its efficiency, but there is some logic in the reasoning. We have also been told that if a broad leaf be picked from the plant and laid flat over the head of cabbage that the worms will congregate on its lower side, where they can be easily destroyed. We have not tried it.

*Circular No. 60, Bureau of Entomology, U. S. Dept. Agr., p. 6.

THE CABBAGE LOOPER.*(Autographa brassicae.)*Order *Lepidoptera*, Family *Noctuidae*.

DESCRIPTION.—A pale-green worm, measuring when grown about one and one-half inches long, more or less distinctly striped, which lies upon the leaf in a humped-up position, and crawls with a looping motion.

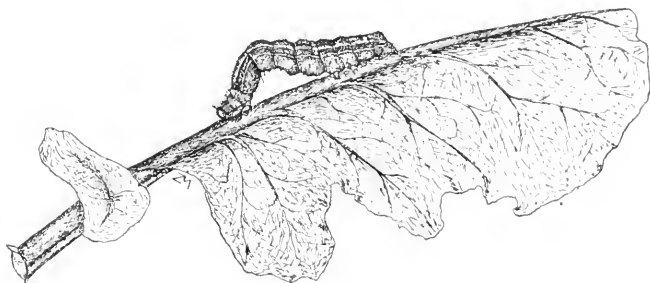


FIG. 11—Caterpillar (or larva) of the Cabbage Looper, on cabbage leaf. Natural size. (Drawing by Z. P. Metcalf.)

INJURIES.—This is the second, or possibly the first, in importance among the “cabbage worms” in North Carolina. Often it is very numerous on cabbage and collards, more especially in late summer and fall.

ADULT INSECT.—The adult parent insect of the cabbage looper is a dull-gray moth, whose wings spread about one to one and one-half inches from tip to tip. The adult moth flies most actively at dusk or on dull days, and is often found on goldenrod in early fall. It is not a conspicuous day-flying insect like the parent of the imported cabbage worm.

LIFE HISTORY, ETC.—The cabbage looper is found in practically all parts of the United States and Canada. The caterpillar, or “worm” attacks all the crops of the cabbage family, including cabbage, collards,



FIG. 12.—Pupa of Cabbage Looper, shown in cocoon on leaf, and separate from leaf. Natural size. (Drawing by Z. P. Metcalf.)

turnip, cauliflower, rutabaga, etc. The adult moth lays the eggs on the leaves and these hatch to the “worm,” which feeds greedily on the leaf. The caterpillar remains in a humped position and crawls with a looping motion, like the insects commonly called “measuring worms.”

When the caterpillar, or "worm" is full grown it spins threads about itself to form a loose sort of cocoon, usually on the under side of a leaf, and inside this it changes to the chrysalis or *pupa* state. The cocoon is so thinly spun that the brown, spindle-shaped pupa can usually be seen inside it. The moth emerges from the cocoon after a few weeks, the exact length of time varying, no doubt, according to season and locality. Ordinarily three weeks would probably represent the length of the pupa stage.

When cold weather comes in the fall, the last worms reach maturity, change to pupæ, and remain in that stage all winter.

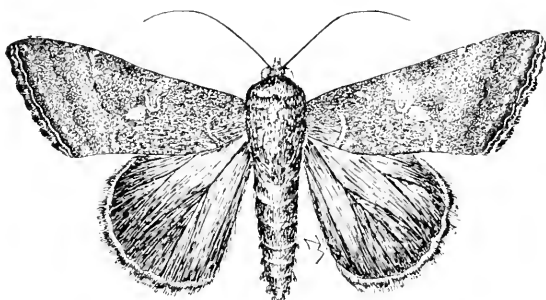


FIG. 13.—Adult moth of Cabbage Looper. Enlarged. (Drawing by Z. P. Metcalf.)

REMEDIES.

All that is said under the head of remedies for the imported cabbage worm (page 27) will apply to this looper. It is combated with Paris green (dry or as a spray) and by all the other means there discussed.

The destruction of remnants is important with this species as with the other, for the insect passes the winter in the pupa state, often on old remnants and rubbish in the cabbage field.

NATIVE CABBAGE WORM.

(*Pontia Protodice*).

Order *Lepidoptera*, Family *Pieridæ*.

DESCRIPTION.—This is another of the "cabbage worms." In size and general habit much like the imported cabbage worm, but is of a dark greenish purple color with four pale yellow strips running the length of the body. It is not so common or so destructive as the two "worms" that have already been described.

LIFE HISTORY, ETC.—This insect is very closely related to the imported cabbage worm (as one may observe if he cares to compare the technical names), but it is a native of North America, while the imported worm is not. This native cabbage worm is found in practically all the inhabited parts of North America, though it seems to be most at home in the

Mississippi valley. The worms feed mainly on the outer leaves. The general appearance of the chrysalis (pupa) is more or less similar to that of the imported cabbage worm.

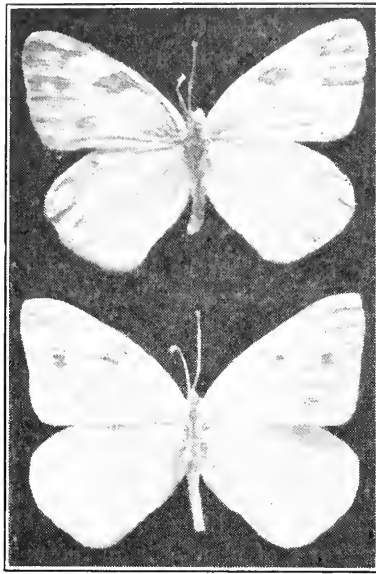


FIG. 14.—Adult butterflies of the Native Cabbage Worm.
Female above. Male below. Natural size.
(Photo by Z. P. Metcalf.)

The adult butterfly is much less common than is that of the imported worm, but the two are considerably alike in general appearance while in flight. When caught and examined closely the native cabbage butterfly is found to have more black markings on the wings, and the female is much more heavily marked than the male.

REMEDIES.

What has been said about remedies for the other two species of "cabbage worms" covers the case completely for this species. (See page 27). The reader should remember that in most essential respects this species is practically like the imported cabbage worm.

THE DIAMOND-BACK MOTH.

(*Plutella maculipennis*.)

Order *Lepidoptera*, Family *Yponomeutidae*.

Also called "The Cabbage Plutella," and "Cabbage Shot-hole Worm."

DESCRIPTION.—The adult parent insect is a very small moth which is so marked that when the wings are closed there are diamond-shaped spots or patches on the back, or upper surface, hence the name of

Diamond-back Moth. The "worm" is a small, slender, green caterpillar, which lives chiefly on under sides of the leaves, and eats small round holes.

INJURY, ETC.—Injury by this insect is not known to be serious in North Carolina, but its work has been noticed and it is an insect which might under circumstances favorable to it, be a serious pest.

When grown the caterpillar spins a small cocoon which is attached to the leaves, and from this the tiny moth emerges. When the wings of the adult moth are spread it is not over one-half inch from tip to tip of the wings; the insect is slenderly built and with narrow wings, so it is a small, frail, inconspicuous insect.

REMEDIES.

There is nothing to be said on the subject of remedies further than to refer to what is said regarding remedies for imported cabbage worm. (Page 27.)

THE CABBAGE WEB-WORM.

(*Hellula undalis*.)

Order *Lepidoptera*, Family *Pyralidae*.

DESCRIPTION.—Yellowish-gray worms or caterpillars, with brownish stripes on the back, measuring little over one-half inch when grown, feeding in the bud or crown of plants, or on the underside of the leaves, and covering themselves with a web.

HISTORY.—The credit for first detecting this insect in this state belongs to Prof. R. I. Smith, Entomologist to the Experiment Station and Agricultural College, who found it quite abundant on turnips at West Raleigh in October, 1907. It had not been recorded at all by the writer in the seven years preceding. It is likely that it is not destructive every year. Prof. Smith discusses this insect in Bulletin 197 of the N. C. Experiment Station, and from that publication the following account is largely taken.

The cabbage web-worm has only been known in North America in comparatively recent years. The first record which we find was at Charleston, S. C., in 1895, and considerable damage was done by it in 1896. It was destructive in Richmond County, Ga., in 1898, and was destructive near Augusta the same year. In 1899 it was destructive at Athens, Ga., and at Auburn, Ala. Now that it is known to occur at Raleigh there is reason to believe that it is present at many places in the State, and it is therefore well that growers should know something of it.

INJURY.—The worms seem to prefer feeding in the bud of young plants or on the undersides of the leaves or in the crown of plants like turnips and beets. On turnips they may burrow into the crown, making shallow channels, and also eat off the leaves at their bases. The worms cover themselves with a web, probably remaining under it most of the time, though they may leave it at night to feed. Young plants are

prevented from growing by the worms eating the bud, and the older plants may be ruined in a few days if the worms are abundant. The presence of web-worms is indicated by webs between the bases of the leaves of cabbage, collard, etc., and in the crown of beets and turnips.

LIFE HISTORY, ETC.—The adult parent moths measure about three-fourths inch across when the wings are spread. The front wings are gray, marked with spots and stripes of darker and lighter color. The hind wings are of lighter color. The moths are hidden during the day, but fly about and lay their eggs at night.

According to Mr. Chittenden* the eggs are laid singly or in masses, and are first white but later change to a pink color. In three or four days they hatch to the caterpillars, which feed on the plants and spin the webs. When the caterpillars are full grown they spin tough silken cocoons between the leaves or in the crown of the plant. Inside of these cocoons they turn to the *pupa* stage, which is spindle-shaped and yellowish-brown in color. The winter is passed in this pupa stage.

REMEDIES.

Prof. R. I. Smith recommends spraying with poisons if the worms are discovered early before they have completely covered themselves with the webs. For this he recommends Paris green at the rate of one pound to 125 gallons of water, using two pounds of lime, slaked, and added to keep the green from settling too quickly. He also says that dry dusting applications, to be effective, should be made with a powder dust gun that will blow the mixture forcibly into all crevices. If one has a dust gun no doubt much good would result from the use of Paris green and lime as a dry dust application as already recommended for the other kinds of cabbage worms. (See page 27.)

As the web-worms seem to prefer cabbage and turnips Prof. Smith suggests that some of these might be planted early and kept thoroughly poisoned as a protection to the main crop which is set out later. Also the destruction of all remnants in fall and winter, either by burning or feeding, will reduce their numbers, as many of them pass the winter on such remnants.

THE CABBAGE MAGGOT.

(*Pegomyia brassicae*.)

Order *Diptera*, Family *Anthomyiidae*.

DESCRIPTION.—Small white worms or “maggots” that eat the outer surface or burrow into the interior of stem and roots.

INJURY IN NORTH CAROLINA.—Without a doubt the actual injury by the cabbage maggot is much greater than the records in this office show. We have very little complaint of its injuries, indeed it has been so seldom mentioned in correspondence as to almost escape actual record. In February, 1902, Mr. D. M. Stanton, of Lenoir County, made inquiry

*Bureau Entomology, U. S. Dept. Agr. Bul. 23, p. 59

about it and there have been only one or two other inquiries since. Still Mr. T. B. Parker, of Raleigh, says that it is somewhat of a pest on his farm at Goldsboro, and as complaint of it is general in some of the northern States, it is almost surely present throughout western North Carolina, even if not complained of. For the present all we can say is that it does occur in the State, although there have been but few actual reports of injury by it.

HISTORY.—The cabbage maggot is another insect which is not native to this country. It was first noticed doing injury around New York City about fifty years ago, and was doubtless first accidentally brought to this country in shipments of cabbage or related plants from across the ocean. It is most destructive in the northern States and Canada. It is even possible that in the southern States there may be other species of cabbage maggots which are really different, though in a general way similar to the northern one.

LIFE HISTORY.—The maggot which does the damage is the larva (or young stage) of a small two-winged fly which looks somewhat like the common housefly but is smaller and more slender.

The adult parent fly lays eggs on the base of the plants or in the dirt close by. The egg hatches in from four to ten days and the young maggot quickly begins to feed on the surface or to burrow inside. The young maggot is without feet and can therefore only move for a very short distance, and finds difficulty in entering the hardened stem, or the hardened earth if there is a crust close to the plants. Hence many of the maggots hatched from eggs that are not actually placed on the plants, are apt to die.

When the maggot becomes full grown it leaves the root or stem and burrows into the earth to a depth of perhaps as much as one inch, then the skin begins to shrink, becomes oval, hardened, and brown in color. Inside the shell or case (technically known as the *puparium*) thus formed the maggot changes to the pupa state in which the legs and wings of the adult fly are formed. In this stage the insect passes from about one to three weeks, and then the adult fly breaks out from the pupa shell and crawls to the surface. In New Jersey, Dr. Jno. B. Smith says that a second brood of flies appears in June, but that they do not seem to do so much damage as the first brood.

The insect may pass the winter, according to Dr. Smith, either as an adult fly, or in the pupa state in the soil. It seems probable that the latter is the more usual.

REMEDIES.

It is extremely difficult to devise methods of treatment for a pest like this which shall be truly satisfactory. Methods that can be used on a few plants become wholly useless to the grower who may have extensive areas that need protection. Among the methods that have been recommended and used in different parts of the country are the following:

CLEAN CULTURE.—Under this head we include the prompt destruction of all remnants after a crop has been gathered so that the insects may

not breed or be carried over winter. Also destroy all weeds so far as practicable, especially wild mustard seeding turnips, etc., as these furnish breeding places.

FERTILIZERS.—The use of quick-acting fertilizers, to force the plants into rapid growth has been suggested. This will enable the plants to quickly develop past the point of easy injury, or will enable them to outgrow slight injuries. As a quick-acting fertilizer there is none to equal nitrate of soda, which is already used by truckers in this State.

At the same time it seems to be a fact that the maggots are worse in fields that are heavily fertilized with stable manure, so that some caution should be observed in this regard where the cabbage maggot is a pest.

SETTING OUT.—At the time of setting out the plants the earth should be firmly pressed around the stem of the plant so that those maggots which hatch in the soil away from the plant will have difficulty in reaching the stem underground. Not only should the surface be packed firmly against the stem, but the dirt for a couple of inches around should be levelled and packed, for this short space of two inches of hard packed dirt will be quite an obstacle to the helpless young maggots which chance not to be hatched on the plant itself. This point of levelling and hardening the ground around the stem is especially important if one intends to use the tarred paper disks, next described.

TARRED PAPER DISKS.—These are a means of protection which has been recommended and used with considerable success in some States. Ordinary tarred paper, such as is used for roofing, is cut into round, square, or six-sided pieces so that the edge of the card is at least two inches from the center. A slit is cut from the edge to the center, at which point several short cross-cuts are made. One of these cards is put on each plant when it is set out, the stem being received into the slit and the card pushed on until the stem is in the center when it is fitted close to the stem and close to the surface of the hardened ground. The maggots which are hatched away from the stems of the plants can not make their way over the tarred surface, and do not like to go under it.

BRAN AND GLUE.—In Minnesota Prof. Washburn has recommended bran and glue as a substitute for the tarred cards or disks. He uses two pound of glue, dissolved in a gallon of water and mixes in half a pound of (wheat) bran. A little of this placed about the base of the plant is said to spread over and penetrate into the ground so as to make an effective covering.

THE CABBAGE SNAKE.

(*Mermis albicans*.)

(This creature is not a true insect.)

DESCRIPTION.—A slender yellowish or whitish worm (several inches long if straightened out) which is sometimes found in heads of cabbage. It is not thicker than an average sewing needle.

NEEDLESS ALARM.—In recent years there has been a great deal of entirely needless alarm over the occasional finding of these worms in heads of cabbage, but as a matter of fact they are not poisonous and

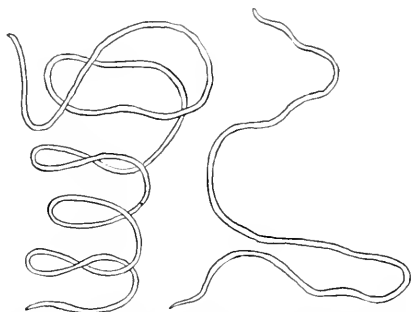


FIG. 15.—The Cabbage "Snake"—really a worm. About natural size.
(Adapted from Chittenden, U. S. Dept. Agr.)

do no harm whatever, and if they should be occasionally eaten by accident with the cooked cabbage no harm could result.

Chemical analyses of the worms have been made without finding evidence of any poisonous substances whatever. Nevertheless local papers and press despatches occasionally refer to persons being poisoned by eating cabbage which is infested by this really harmless but supposedly poisonous worm.

While there is not really the slightest need of paying any attention whatever to these disquieting rumors, and while the cabbage is still a healthy and delicious vegetable (as it has always been), still a good many sincere persons have become so uneasy over the matter that they hesitate to eat cabbage, even though they are fond of it, and in some localities it is said that local stores and markets have had a noticeable decrease in demand for cabbage. We believe, however, that this "false alarm" is dying out in this State, and surely the general demand for cabbage throughout the country at large has not been any less on account of it.

THE FACTS.—As a matter of fact this "Cabbage Snake" is not really a snake at all, nor is it a true insect, since there is no state of its existence when it has legs, wings, or "feelers." It is merely a *worm*, and is a worm from the time it hatches from the egg until it dies of old age.

These worms (either the same one found in cabbage or others very close kin to it) are found in various situations. As already indicated they may be found in the head of cabbage. One was sent to this office taken from the core of an apple. Several have been sent in by persons who found them in well water. They have been found as parasites inside the bodies of grasshoppers, crickets and other insects. When found in apples the explanation probably is that they were first parasitic in the caterpillar which infests the fruit of the apple. While we can not positively tell just how they get into cabbage it seems likely that they are first parasitic inside the bodies of grasshoppers or other insects (perhaps one of the cabbage worms) and are left in the head of cabbage

when the insect dies or goes elsewhere. They are always very much dependent on moisture, and could easily live in the moist interior of a head of cabbage which almost always contains some water, rain, dew, etc.

Many persons have heard the story that if a horse hair falls in a stagnant pool, it will form a "hair-snake." This idea (which is not at all true) is kin to this cabbage snake idea. These slender worms are often found in water (even in good wells) where, on account of their slender form they doubtless gave rise to the erroneous idea that they developed from hairs. As a matter of fact a hair (whether from man or beast) does not turn into anything else. However, a hair from a horse's mane or tail might fall into a pool, and might become coated over with dirt and slime until it would look like one of these worms. Even further, the hair might become actually the abiding place of minute forms of animal life, and it might gradually twist and distort its shape in the water. But as for the hair becoming a living worm, no, never!

So far as we know, the grow hair-worm lays eggs and these hatch to tiny small worms. If chance offers these worms may infest the bodies of insects and thus be carried to other places. We do not know all the intimate details of how the worm gets to the places it does, but the worm is a well-known and well-recognized member of the animal kingdom, and is known not to possess any poison, nor to be imbued with any unusual or mysterious power or effect.

Many efforts have been made to trace *definitely* the rumors of sickness and death caused by eating cabbage infested with these worms, but in every case absolute proof is lacking. The *reports* and *rumors* have been common enough, but no one in position to judge, no qualified physician, zoologist or entomologist has given any real proof whatever on the subject.

The "cabbage snake," therefore, so far as being a real danger is concerned, is a mere supersition, a "fake" apparently started by ignorant or mischievous persons. The scare has done harm enough. Let it die.

OTHER INSECTS.

It need hardly be said that there are insects other than those here mentioned which are occasionally found on cabbage and which on occasion may do more or less severe injury. There are many different kinds of caterpillars (all eventually developing to moths or butterflies), and also various beetles, which may feed on the leaves, but these are not to be considered as regular pests of the crop.

Should any reader detect really serious injury by any insect not mentioned in these pages, or if very unusual injury by the ones here discussed be noticed, the writer would like to be advised. The Division of Entomology of the State Department of Agriculture is maintained for the purpose of studying these problems.

USING POISONS ON CABBAGE.

In this bulletin we have not hesitated to recommend the use of poisons against some of the most troublesome cabbage insects, especially the

various cabbage worms. To one who has never tried it, and who has not fully reasoned the matter out, it might seem that this would be dangerous, therefore we propose here to discuss the matter carefully and show why there is no really appreciable danger.

In the first place it is assumed that the cabbage grower will exercise ordinary good sense and judgment in applying poisons (or any other remedies) to his plants. It is never necessary to cover a leaf or plant with a thick coat of Paris green, just a light even dusting (*one ounce* Paris green mixed into *one pound* lime) is all that is usually necessary. It is assumed that no grower will poison his cabbage just a day or two before it is cut, for that would not give time enough to do much good; the poison is to protect the *growing plants*, and there is no occasion for applying it when the cabbage is entirely matured. Cabbage which are well protected during their growth will not suffer much from slight attack when grown. Treatments with poison should not be given within two or three weeks of the time the cabbage is to be cut. Let it be clearly understood that we do not recommend a wasteful application of paris green, or that it be applied at any and all times, but we do recommend light dusting applications (*one ounce* paris green to *one pound* lime) from time to time during the growing season, the treatments to be stopped two or three weeks before the cabbage is to be cut. This policy is abundantly safe.

But the reader may want further assurance. In October, 1908, Mr. Metcalf, Assistant Entomologist, working under directions of the writer, made a test of this mixture on collards at Raleigh. Now if there is any danger whatever from these applications it would be greater with collard than with cabbage, for the collard does not form a head, and consequently every leaf will get some of the poison. The plants at that time were of good size. In treating 460 collards one and one-fourth pounds of the mixture was used, this representing one and one-fourth ounces of paris green. Paris green is about 59 per cent arsenic (the real poison element). It is considered that one-fourth grain of arsenic is a dangerous dose, hence one and one-fourth ounces contains about 1,390 dangerous doses. This was distributed on 460 plants, or an average of about three dangerous doses was used for each plant. Hence to get enough poison to be a dangerous dose one would have to eat one-third of a plant, even assuming that *all* of the poison went on the leaves, and assuming that *none* of it was removed by rains, washing, etc.

Now let us see how it works out in practice. A great deal of the dust never gets on the plants at all, probably one-fourth or one-third of it falls on the ground or is borne away in the air. Of the poison that is put on the plant probably over half falls on the large rough outer leaves that are not used for cooking. Of the small amount that does get on the edible parts, the greater portion is removed by wind, or rain, or by the natural growth of the plant. And finally what small fraction of poison there is left is almost completely removed by washing before the vegetable is cooked. We see, therefore, that when used with ordinary judgment and caution, the amount of poison that is in the vegetable when it is consumed is so extremely small as to be insignificant.

If this is true with collard, it is still more true with cabbage, which forms a tight head, the outer leaves of which protect all the inner parts so that the poison does not reach them. In treating cabbage which are forming the heads the poison will get only on the outer leaves, and these outer leaves are always stripped off by the housewife before the cabbage is cooked. So here the amount of poison that might possibly be in the cooked vegetable is even less than with collards.

There is a peculiarity about the growth of cabbage that seems almost as if designated to permit us to use poison safely against these worms, and that is that the cabbage forms its head from the inside. The broad rough outer leaves (the ones which get nearly all of the poison) do not fold together to make the head. The head *grows from within*, and these outside leaves are all the time being pushed out and shed off by the plant. So a cabbage plant which is protected by poison during its growth has almost no poison at all on the head itself, and by the time the outer leaves of the head are removed and the head quartered and washed at the kitchen, it would take a very close chemical analysis to reveal even a "trace" of arsenic.

In Kentucky in 1901* cabbage sprayed as much as four times with paris green and water, were chemically analyzed, but only a "trace" of poison was found, not enough to poison a person under any circumstances. In 1902 and 1903 similar tests were made without finding even a chemical "trace," and in 1903 the outer leaves alone were analyzed separately, but there was not enough poison to be measured by the exacting processes of chemistry. The fact is it takes only an infinitely small quantity of paris green to kill a cabbage worm, and practically all trace is gone before the cabbage is eaten.

Mr. Chittenden says:† "The use of arsenicals (Paris green, etc.), against cabbage worms is almost universal in the United States, although growers are sometimes loath to acknowledge the fact. There are no authentic recorded instances known to the writer of poisoning from the consumption of cabbage treated with an arsenical."

Dr. Jno. B. Smith, of New Jersey, says: "The cabbage heads from within, that is to say the leaves unfold from the center of the head and do not fold together to form it; therefore, whatever poison is put upon the plant can fall only upon the outer leaves, and not a particle gets into the head itself." (Economic Entomology.)

From all of which we are certainly safe in the conclusion that light applications of Paris green either as dust or as a spray can be made at any time while the plants are growing without any injury or danger whatever to the person who finally eats the cabbage.

*Bul. No. 114, Kentucky Experiment Station, by H. Garman (1904).

†Circ. No. 60, Bur. Ent., U. S. Dept. Agr., p. 7.

FORMULAS FOR PREPARING REMEDIES.**SOAP SOLUTION.**

(For cabbage louse.)

Laundry soap	1 pound.
Water	4 gallons.

Shave the soap into thin pieces into two gallons of water and heat to boiling. Stir thoroughly to dissolve the soap. Then add two gallons water (to make the required four gallons) and apply with spray pump or sprinkler while it is still warm.

One pound potash washing powder dissolved in four gallons water may be used for same purpose.

If possible use a spray pump and use good pressure to get a fine strong mist.

KEROSENE EMULSION.

(For cabbage louse, terrapin bug, etc.)

Kerosene oil	2 gallons.
Soap	$\frac{1}{2}$ pound.
Water	1 gallon.

Shave the soap in thin pieces into the water and heat to boiling to dissolve the soap. *Remove from the fire* and pour in the oil, and churn the whole together violently for several minutes. Now add water to reduce it to desired strength:

To get 10 per cent: Add 17 gallons water and stir thoroughly.

To get 15 per cent: Add 10 $\frac{1}{2}$ gallons water and stir thoroughly.

In making kerosene emulsion the important points are, to get the soap, water, and oil thoroughly combined in the first place, and then to be sure that the proper amount of water is added to reduce it to proper strength.

Apply with spray pump if possible, using good pressure and fine mist.

POISONED BRAN MASH.

(For cutworms, cabbage worms, etc.)

Dry Method. Mix one ounce of Paris green with two pounds of wheat bran. Mix in enough sugar to give some sweetening. Sprinkle on or near the plants by sifting through the fingers.

Wet Method. Mix one ounce of Paris green with two pounds of wheat bran. Add sugar enough to sweeten and water enough to make the mixture wet. If preferred, the mixture may be sweetened with molasses.

POISONED CLOVER BAIT.

(For cutworms.)

Cut a sufficient quantity of green clover (crimson clover is excellent for the purpose) and saturate it in water which is poisoned with Paris green at the rate of one pound of green to one barrel (50 gallons) of water. Or, five pounds of arsenate of lead may be used to one barrel

of water for the same purpose. Fork the clover about in the solution so that every leaf and stem will be submerged and poisoned.

Scatter this through the beds or fields before the cabbage is set out and many cutworms will be killed by eating it.

LIME AND PARIS GREEN.

(Dusting process for cabbage worms.)

Dry air-slaked lime	1 pound.
Dry Paris green	1 ounce.

Mix the two together thoroughly until all is one even uniform color, with no spots or streaks showing more green than others. Tie in a thin cheese cloth or muslin sack from which it can be sifted by shaking. Or apply with a powder gun or blower.

This may be lightly dusted over the growing plants from the time they are set until two or three weeks before using, when applications should cease. It is a cheap, easy, effective remedy for the common cabbage worms, and it is entirely safe when used with reason.

PARIS GREEN SPRAY.

(Spraying process for cabbage worms.)

Paris green	5 ounces.
Water	50 gallons.

Mix the Paris green first in a small quantity of water until it is all thoroughly wetted. Then stir it into the entire amount of water, and it is ready to use. Apply with a spray pump or sprinkler, the finer the spray the better. Keep it constantly stirred.

Note. We see no reason why arsenate of lead should not be used in this treatment but so far as we know no definite experiments with it have been reported. We merely suggest that if one wants to try the arsenate of lead, it be used at rate of two pounds to fifty gallons of water.

OTHER REMEDIES.

Several other simple treatments, such as the use of hot water, etc., are mentioned at proper place in the preceding pages of this bulletin, but do not require special mention here.

CABBAGE DISEASES.*

BY F. L. STEVENS.

BOTANIST AND PATHOLOGIST OF THE NORTH CAROLINA COLLEGE OF AGRICULTURE AND
MECHANIC ARTS, WEST RALEIGH, N. C.

A very brief account is given below of the most important cabbage diseases with suggestions as to their treatment.

Black Rot: The leaves first show signs of disease upon their edges by a blackening of the veins. This blackening rapidly extends down the veins toward the stalk and thus up other veins and eventually throughout the plant. The diseased leaves soon turn yellow and wilt and eventually fall to the ground. The disease may always be recognized with certainty by the black veins which are especially conspicuous in cross sections of the leaf stem. The disease is caused by bacteria which enter through small holes (water pores) at the leaf edge. These bacteria may remain in infected fields for years, may be spread by manure which has received infected trash, and may also be carried upon seed. No remedy is known for fields after they are once infected, except a long crop rotation, avoiding all susceptible plants. To avoid introducing the disease on seed it is well to soak the seed in corrosive sublimate one part, hydrochloric acid two parts, and water 1,000 parts, soaking for fifteen minutes. The disease now practically precludes successful cabbage growing in many sections of the State, to which it has come upon seed.

Club Root: In this disease the root becomes very greatly swollen and distorted and the plant is so weakened as to be valueless. This is a germ disease whose causal organisms remain in the soil from year to year, therefore, fields which have borne a diseased crop should not be planted again to susceptible crops without a long intervening rotation. The disease may be spread to new fields by infected refuse or manure which has received such refuse. Especial care should be taken to use uninfected soil for the seed bed and to avoid infecting the seed bed with manure or refuse. In some sections it has been found profitable to use air-slaked stone lime, 75 bushels per acre, applied some weeks before planting.

Downy Mildew: Characteristic downy white patches appear on the lower surface of the leaves. The corresponding areas as seen from above turn yellow. This disease is seldom serious in the field but is occasionally damaging in the seed bed. The diseased plants should be sprayed with Bordeaux mixture. After setting all diseased plants remaining in the bed should be destroyed by fire.

*This brief article was prepared by Dr. Stevens at the request of the author of this Bulletin because many growers will desire to have some knowledge of the *diseases* available in the same Bulletin which discusses the *insects*. The grower should remember, however, that the two subjects involve entirely separate fields of study. Plant *diseases* come under the study of the botanist, while the *insects* are studied by the entomologist.

The Wilt. (Yellow Sides.): The leaves turn pale and fall away. The plants die. Often the stem rots and the plant topples over to one side. This disease is of unknown cause, but seems to recur year after year on the same soil. Long rotation should therefore be followed and in general precautions suggested under Black Rot should be observed.

All of the above diseases affect besides cabbage, kale, cauliflower, turnip, rutabaga, collards, Brussels sprouts, radish, stocks, candytuft, sweet alyssum, shepherd's purse, pepper grass, penny cress, black mustard, charlock, false flax, hedge mustard, and other cruciferous plants.

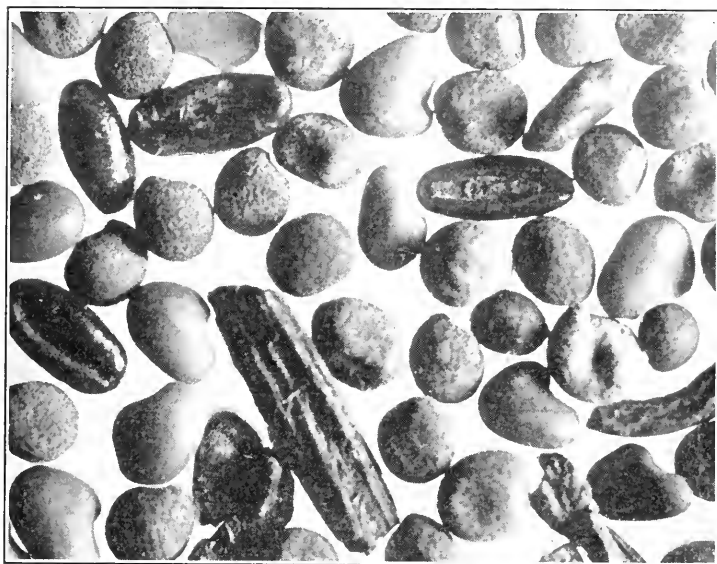
These plants should therefore be avoided in any system of rotation designed to prevent these diseases.

LEAF TOBACCO SALES FOR MAY, 1911.

Pounds sold for producers, first hand.....	144,223
Pounds sold for dealers.....	8,769
Pounds resold for warehouses.....	4,786
Total.....	<u>157,778</u>



THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
DIVISION OF BOTANY
RALEIGH



A TRADE SAMPLE OF RED CLOVER SEED.

PURE SEED 51%

DODDER SEED 37%

WHAT IS THE RESULT OF PLANTING SUCH SEED?

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Post-office at Raleigh, N. C., as second-class matter,
February 7, 1901, under Act of June 6, 1900.

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¹Assigned by the Bureau of Soils, United States Department of Agriculture.

²Assigned by the Bureau of Plant Industry, United States Department of Agriculture.

RALEIGH, June 15, 1911.

SIR:—I submit herewith a paper portraying some of the conditions found in the red clover seed-trade of the State for the present year. The purpose of this paper is to call the farmers' attention to the importance of good seed.

I recommend its publication as Supplement to the JULY BULLETIN.

Respectfully,

O. I. TILLMAN,

Botanist.

To HON. W. A. GRAHAM,

Commissioner of Agriculture.

CONDITIONS IN THE RED CLOVER SEED-TRADE OF THE STATE FOR THE PRESENT YEAR.

By O. I. TILLMAN, BOTANIST.

From the results of one hundred and twenty tests of red clover seed made the present year, circumstances seem to call for a warning on the matter of the quality of seed offered for sale in the State. It is the progressive and successful farmers who are becoming to more and more recognize the importance of the quality of seed used for planting, as well as better varieties and improved methods and machinery. There are many uncontrollable factors of loss in agriculture, but a great and preventable one is the planting of poor seed. Farmers, as a rule, do not realize the extent of the evil and see how the sale of poor seed affects them personally; but the harvest in no small way depends upon the seed sown. There is sown annually a great amount of poor seed, which often contains or is adulterated with the seeds of vile weeds, which frequently cause great injury and loss to the farm.

Red clover is the principal leguminous crop of the United States and plays an important part in the maintenance of successful agriculture, and consequently special attention should be given to the quality of the seed, which is frequently impure, adulterated, or dead; and it certainly would be profitable for the farmers of the State to know the quality of the seed they plant, since of the 120 samples of red clover seed analyzed this year, 31% failed to meet the requirements of the State Seed Act and to come up to the standard of good-grade seed.

A striking illustration of the fact that there are widely different grades of the same kind of seed on the market, and even at the same price, will be brought out by comparing two samples of seed offered for sale in the State last fall. Figures 1 and 3 are photographs of a sample of good-grade red clover seed, which analyzed 99.6% pure seed, with one kind of weed seed present, and germinated 95%. The actual value or the pure germinable seed of this sample was 94.6%. The retail price was 15 cents per pound and the actual cost of the seed was 16 cents. Figures 2 and 4 are photographs of a sample of low-grade red clover seed, which analyzed 74.6% pure seed, the greater part of which were old, shriveled, poor seed, with 26 different kinds of weed seeds present, and germinated 41%. Many of the sprouts were weak, and no doubt would be unable to even get through the ground. The actual value or the pure germinable seed of this sample was 30.6%. The retail price was 15 cents per pound, but the actual cost of the seed was 49 cents. The cost of seeding an

acre, sowing at the rate of 15 pounds, would be \$7.35, using this quality of seed; while the cost of seeding an acre, using the better grade seed, would be \$2.40. This high price is a minor consideration when one realizes that more than 300,000,000 weed seeds would be sown per acre by planting the low-grade seed. This is a common means by which weeds are introduced on the farm, and often renders the land worthless for growing certain crops.

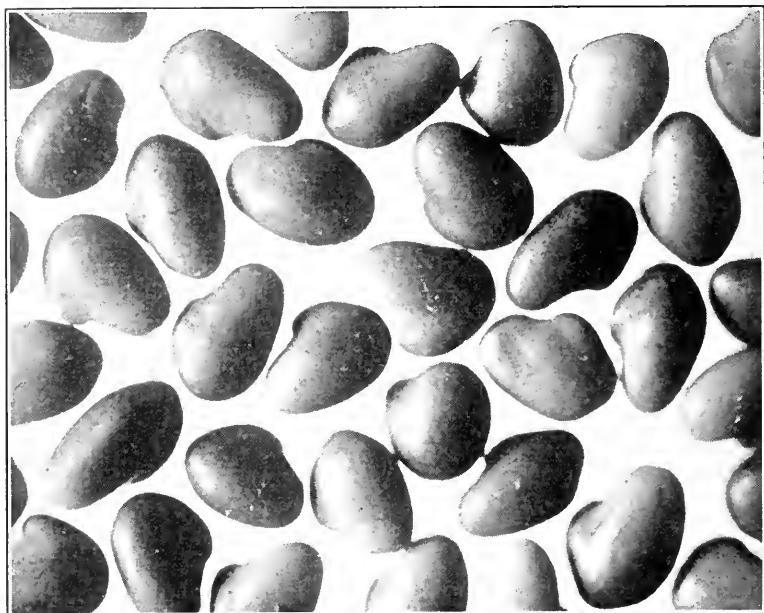


FIG. 1. Good-grade Red Clover Seed.

The undesirable conditions in the seed trade rest quite as much with the mass of farmers who demand low-priced seed as with the dealers who meet this demand. When the farmers realize that some other consideration, aside from merely the price, must be the guide in purchasing, and that low-priced seed is not the cheapest and not necessarily the highest-priced seed is the best, but that the best quality that can be bought is the cheapest seed; when they will have nothing but a good grade, the dealers will be compelled to meet this demand. A large part of the dealer's profit is derived from the sale of screenings and low-grade seed. For instance, when good seed is selling for 15 cents per pound and a farmer demands a cheaper grade, the dealer will mix screenings and low-grade seed worth 3 or 5 cents per pound with the better grade seed to make the various cheaper

grades. The mixing, of course, is done proportionately to the price, and to the profit of the dealer, and to the loss of the farmer.

An examination of samples of seed offered for sale by farmers will convince one that the seed dealer is not the only sinner in the clover-seed business. Although there is no commercial production of red clover seed in the State, farmers in certain sections produce small amounts which they often sell to their neighbors or to local seed deal-

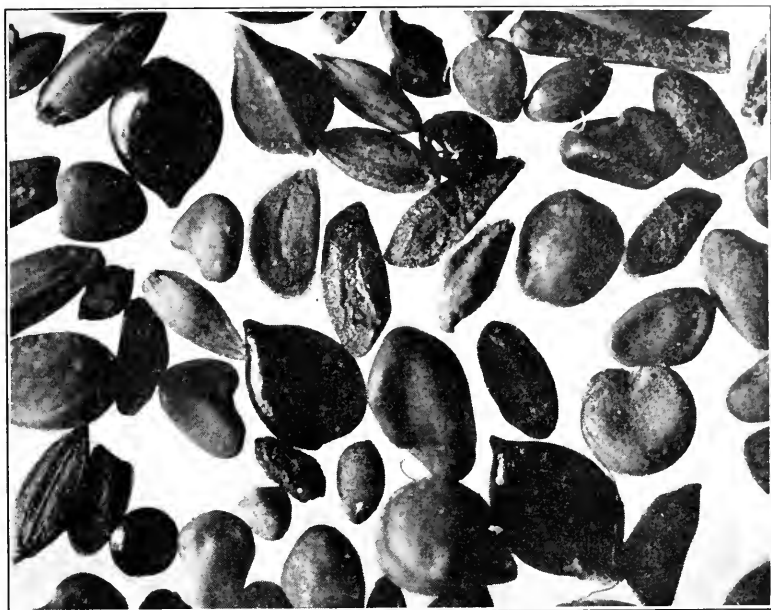


FIG. 2. Low-grade Red Clover Seed.

ers. This may be good seed, but it very often is not, as the farmers are not careful to keep the fields free from weeds and do not have the machinery necessary to clean the seed properly. It, therefore, often contains a high per cent of noxious weed seeds and dirt.

One of the worst samples that has come to the notice of this laboratory is a sample of red clover seed, which was grown and offered for sale by a farmer. A photograph of this seed is shown on the cover page. It contained 37% of Field Dodder or Love Vine, which in clover is so serious a pest that seed containing even a trace of it should not be planted. Of the 120 samples of red clover seed tested this year, 22% contained either Field or Clover Dodder seed.

The results of tests show that one can neither depend upon the seed purchased from dealers nor from farmers to be of good quality, and

the only reliable way to obtain good seed, both for the consumer and the trade, is to know the quality or value of the seed. This can accurately be done by testing. The North Carolina Seed Laboratory, cooperating with the United States Seed Laboratory, will examine, without charge, red clover and all farm seeds for adulteration, and make tests both for purity and germination. The purity test consists in determining the per cent of pure seed, foreign seed, and inert

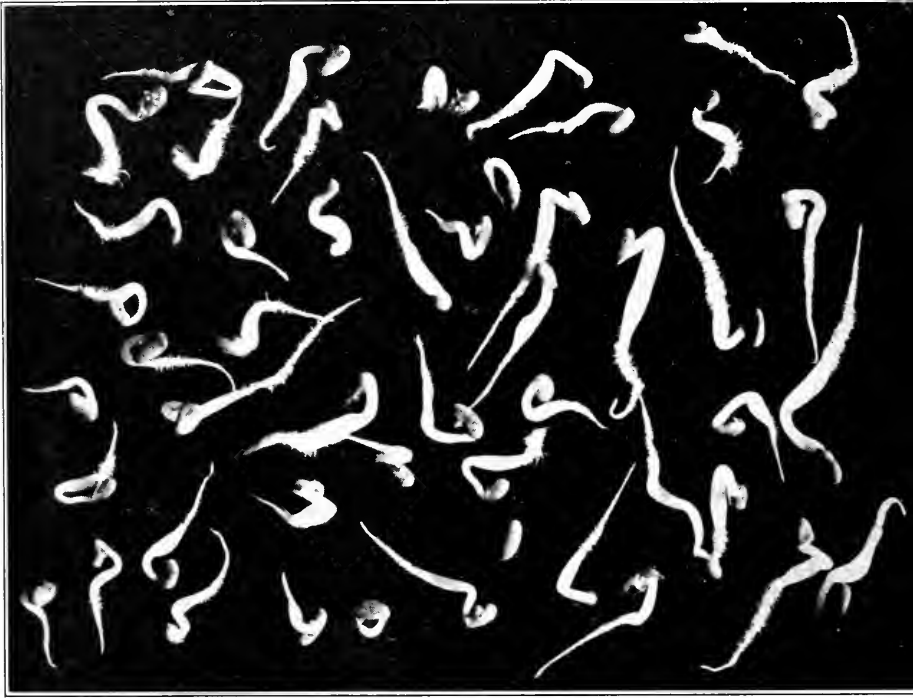


FIG. 3. High Vitality Red Clover Seed. 95 Per Cent Germination.

matter, as gravel, dirt, etc.; and by the germination tests the per cent of seeds that will grow is determined.

The following brief description of good red clover seed may aid the purchaser in determining a good quality seed. The seeds should be plump, irregularly triangular in shape, with unequal sides and rounded angles. The color varies from violet to light yellow; some seeds are entirely violet and others are light yellow, while some are both colors. The surface is smooth and has a luster. Old seeds lose their luster and become a dull brown color, the darkness depending upon the age of the seed. As the seed becomes old it loses its germi-

nating power, and results of germination tests show that little is lost by discarding old seed if the standpoint of the farmer, who uses it, is maintained. Low germination may not be entirely due to old seed, but unfavorable conditions of development or of harvesting may cause seeds to be of low vitality.

Below are given the number of occurrences of foreign seeds found in the 120 samples of red clover seed tested the present year:

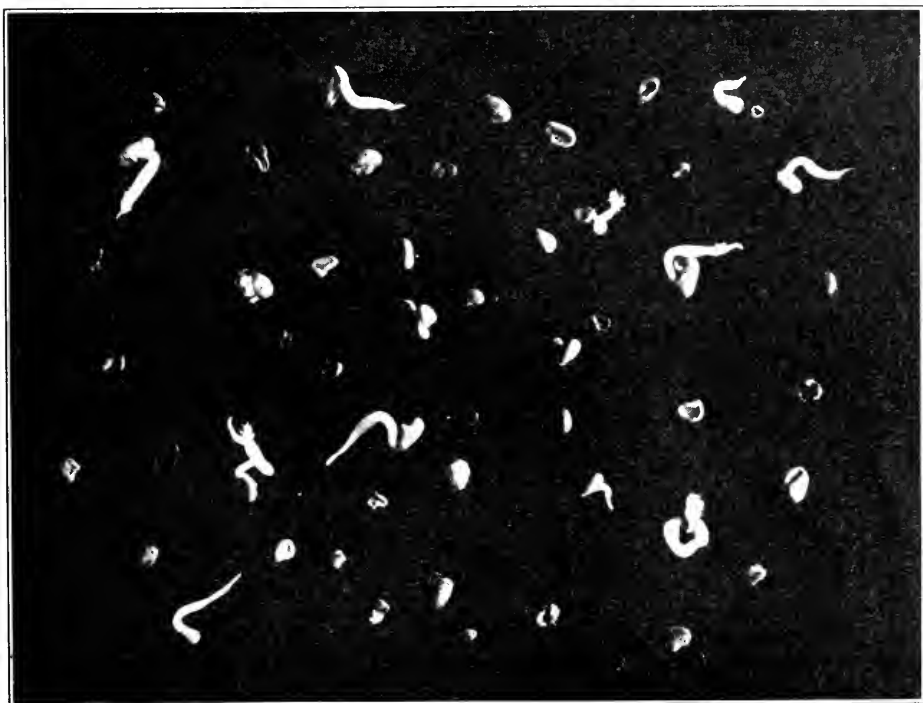


FIG. 4. Low Vitality Red Clover Seed. 41 Per Cent Germination.

COMMERCIAL SEEDS.

Timothy 82.	Kentucky Blue-grass 9.
Alsike Clover 76.	Rape 8.
White Clover 60.	Rye-grass 5.
Alfalfa 35.	Orchard-grass 2.
Redtop 19.	Oat-grass 1.
Italian Millet 15.	Wheat 1.
Crimson Clover 9.	Rye 1.
	Bermuda-grass 1.

WEED SEEDS.

Buckhorn 82.	Catnep 3.
Green Foxtail 65.	Cut-leaved Crane's-bill 3.
Curled Dock 59.	Wild Mustard 3.
Rugel's Plantain 46.	Common Plantain 3.
Field Sorrel 38.	Wood Sage 3.
Lady's Thumb 33.	Bitter Dock 3.
Ragweed 32.	Wild Raspberry 3.
Yellow Foxtail 27.	Canada Thistle 3.
Wild Carrot 27.	Mallow 3.
Field and Clover Dodder 26.	Atriplex 2.
Lamb's Quarters 22.	Red Pimpernel 2.
Large Spotted Spurge 19.	Rough Cinquefoil 2.
Witch-grass 17.	American Pennyroyal 2.
Heal-all 16.	Fremont's Goosefoot 2.
Small Crab-grass 12.	Field Cress 2.
Virginia Three-seeded Mercury 11.	Bluweed 2.
Large-bracted Plantain 10.	Woolly Panicum 2.
White Champion 10.	Apetalous Pepper-grass 2.
Night-flowering Catchfly 10.	Hudge Mustard 2.
Chicory 9.	Paspalum 1.
Large Crab-grass 9.	Thistle 1.
Ciliate-leaved Paspalum 8.	Wild Sage 1.
Grass 8.	Bell Isle Cress 1.
Barnyard-grass 7.	Black Bindweed 1.
Prickly Sida 7.	Field Paspalum 1.
Rough Pigweed 7.	Slender Finger-grass 1.
Bird's-foot Trefoil 7.	Wild Mignonette 1.
Sedge 7.	Panicum 1.
Sweet Clover 6.	Wild Pansy 1.
Star Thistle 6.	Hoary Vervain 1.
Nightshade 6.	Sunflower 1.
Wild Pepper-grass 5.	Yarrow 1.
Low Mallow 5.	Coronilla 1.
Blue Field-madder 5.	Black Mustard 1.
Amaranth 5.	White Weed 1.
Knotted Hedge-parsley 5.	Buttercup 1.
Rabbit-foot Clover 4.	Small-flowered Crane's-bill 1.
Mayweed 4.	Russian Thistle 1.
White Vervain 4.	Slender Foxtail 1.
Common Evening-primrose 4.	Tare 1.
Diffuse Panicum 4.	Rocquette 1.
Persicaria 4.	Low Hop-clover 1.
Wild Mint 4.	Bristly Ox-tongue 1.
	Corn Canomile 1.

Since there is no red clover seed producing locality in the State of commercial importance, the retail dealers have to depend upon wholesale dealers for their supply, and as their local reputation and business depends upon the quality of seed they handle, it would be well if the retail dealers would give consideration as to the firms from whom they purchase seed. From the tests of samples received the present year from individual farmers, who desired to know the value of the seed they had purchased or were considering purchasing, and from our seed inspectors, who collected samples from seed offered for sale by State dealers, information was received concerning the quality of red clover seed sold in the State by twelve wholesale dealers, who are listed below according to the quality of seed found to be sold by them. The seed of the firm listed first was the best grade, and so on down.

1. Henry Nungesser & Co., New York City.
2. Crumbach, Kuehne & Co., Toledo, O.
3. N. R. Savage & Son, Richmond, Va.
4. T. W. Wood & Sons, Richmond, Va.
5. Diggs & Beadles, Richmond, Va.
6. National Seed Company, Louisville, Ky.
7. Hamilton, Bacon & Hamilton, Bristol, Tenn.
8. Roanoke Carriage Company, Roanoke, Va.
9. Hardin, Hamilton & Lewman, Louisville, Ky.
10. C. S. Brent, Lexington, Ky.
11. Smith's Feed and Seed Company, Danville, Va.
12. J. Bolgiano & Son, Baltimore, Md.

Any individual or dealer desiring to know the value of any agricultural seed can do so by sending a sample in and having it tested. Of the smaller seeds, such as red clover, about three tablespoonfuls is a sufficient amount. Of the larger seeds, as oats, about a cupful is necessary. The following information should accompany all samples sent in for testing: Name and address of wholesale and retail dealer, retail price, and name and address of sender. There is no charge for making tests. Address all samples to the Seed Laboratory, North Carolina Department of Agriculture, Raleigh, N. C.

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE,
RALEIGH.

Vol. 32, No. 8.

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Whole No. 155.

- I. ANALYSES OF FERTILIZERS { FALL SEASON, 1910.
SPRING SEASON, 1911.
- II. ANALYSES OF COTTON-SEED MEAL.
- III. REGISTRATION OF FERTILIZERS.

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, N. C., July 15, 1911.

SIR:—I submit herewith analyses of fertilizers and cotton-seed meal made in the laboratory of samples collected during the past fall and spring. These analyses show fertilizers and meals to be about as heretofore and to be generally what was claimed for them. I recommend that it be issued as the August BULLETIN.

Very respectfully,

B. W. KILGORE,

State Chemist.

TO HON. WILLIAM A. GRAHAM,

Commissioner of Agriculture.

I. ANALYSES OF FERTILIZERS.

FALL SEASON, 1910; SPRING SEASON, 1911.

By B. W. KILGORE,

W. G. HAYWOOD, J. M. PICKEL, J. Q. JACKSON AND W. H. STROWD.

The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during fall months of 1910 and the spring months of 1911. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

TERMS USED IN ANALYSES.

Water-soluble Phosphoric Acid.—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

Reverted Phosphoric Acid.—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

Available Phosphoric Acid is made up of the water-soluble and reverted; it is the sum of these two.

Water-soluble Ammonia.—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these

(nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

Organic Ammonia.—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

Total Ammonia is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

FORM OF POTASH IN TOBACCO FERTILIZERS.

Tobacco growers are becoming yearly more disposed to know the form of potash, whether from kainit, muriate or sulphate, which enters into their tobacco fertilizers. Considerable work of this kind has been done for individuals, and we now determine the form of potash in all tobacco brands, for the benefit of tobacco growers.

The term potash from muriate, as reported in the analyses, does not mean, necessarily, that the potash was supplied by muriate of potash. Sulphate or some other potash salt may have been used, but in all fertilizers where the term potash from muriate is used, there is enough chlorine present to combine with all the potash, though it may have come from salt in tankage, kainit, or karnalite. As the objection to the use of muriate of potash in tobacco fertilizers arises from the chlorine present, it does not matter whether this substance is present in common salt or potash-furnishing materials.

The use of sulphate of potash where there is chlorine present in the

other ingredients of the fertilizer will not prevent the injurious effect of the chlorine. The term potash from muriate in our analyses, therefore, means that there is sufficient chlorine present in the fertilizer from all sources to combine with the potash to the extent indicated by the analyses.

VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the cost of fertilizing materials is liable to change as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

Relative value per ton, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

VALUATIONS FOR 1910.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag, and Peruvian guano	3½	cents per pound.
For nitrogen	18	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid.....	4½	cents per pound.
For nitrogen	19½	cents per pound.
For potash	5½	cents per pound.

VALUATIONS FOR 1911.

In Unmixed or Raw Materials.

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal, basic slag, and Peruvian guano	3½	cents per pound.
For nitrogen	19½	cents per pound.
For potash	5	cents per pound.

In Mixed Fertilizers.

For phosphoric acid.....	4½	cents per pound.
For nitrogen	21	cents per pound.
For potash	5½	cents per pound.

HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percentage or Lbs. in 100 Lbs.</i>	<i>Value Per 100 Lbs.</i>	<i>Value Per Ton, 2,000 Lbs.</i>
8 pounds available phosphoric acid at 4½ cents...	0.36 × 20 =	\$ 7.20
2 pounds potash at 5½ cents.....	0.11 × 20 =	2.20
1.65 pounds nitrogen at 21 cents.....	0.347 × 20 =	6.94
Total value.....	0.817 × 20 =	\$16.34

Freight and merchants' commission must be added to these prices. Freight rates from the seaboard and manufacturing centers to interior points are given in the following table.

FREIGHT RATES FROM THE SEABOARD TO INTERIOR POINTS. From the Published Rates of the Associated Railways of Virginia and the Carolinas. In car-loads, of not less than 100 tons each, per ton of 2,000 pounds. Less than car-loads, add 20 per cent.

Destination.	From Wilmington, N. C.	From Norfolk and Portsmouth, Va.	From Charleston, S. C.	From Richmond, Va.
Advance	\$ 3 20	\$ 3 20	\$ 3 10	\$ 3 20
Apex	2 70		3 80	3 00
Asheboro	3 20	3 20	3 60	3 20
Asheville	4 00	4 00	4 00	4 00
Chapel Hill	2 95	3 20	3 90	3 20
Charlotte	2 65	3 20	2 85	3 20
Clayton	2 48	2 86	3 65	2 80
Cherryville	3 85	3 60	3 40	3 65
Clinton	1 60	3 00	3 20	3 00
Creedmoor	3 00	3 00	3 80	3 00
Cunningham	3 00	2 40	4 00	2 40
Dallas	3 00	3 60	3 40	3 60
Davidson College	3 00	3 20	2 20	3 20
Dudley	1 70	3 00	3 20	3 00
Dunn	2 00	2 80	3 20	2 80
Durham	2 80	2 83	3 20	2 83
Elkin	3 60	3 20	3 60	3 20
Elm City	2 10	2 60	3 20	2 60
Fair Bluff	1 60	3 80	2 40	3 80
Fayetteville	1 80	3 00	3 00	3 00
Forestville	2 85	3 00	3 80	3 06
Gastonia	3 12	3 25	3 12	3 25
Gibson	2 10	3 50	2 10	3 50
Goldsboro	1 80	2 80	3 20	2 80
Greensboro	2 96	3 00	3 40	3 00
Hamlet	2 00	3 00	3 60	3 00
Henderson	3 00	2 83	3 55	2 83
Hickory	3 20	3 60	3 20	3 60
High Point	3 00	3 08	3 40	3 08
Hillsboro	2 88	2 88	2 68	2 88
Kernersville	3 00	3 00	3 40	3 00
Kinston	2 10	2 80	3 50	2 80
Laurel Hill	1 90	2 40	3 80	3 40
Laurinburg	1 90	3 40	3 80	3 40
Liberty	2 72	3 60	3 80	3 60
Louisburg	2 95	3 00	3 80	3 00
Lumberton	1 60	3 60	3 70	3 60
Macon	3 05	3 00	3 85	3 00
Madison	3 00	3 00	3 40	3 00
Matthews	2 60	3 20	3 20	3 20
Maxton	1 80	3 40	2 70	3 40
Milton	3 44	2 40	4 00	2 40
Mocksville	3 36	3 20	3 40	3 20
Morven	2 55	3 60	2 50	3 60
Mount Airy	3 20	3 40	3 80	3 40
Nashville	2 30	2 90	3 40	2 90
New Bern	1 25	1 75	3 95	1 75
Norwood	3 68	3 20	3 20	2 23
Oxford	3 04	2 83	3 55	2 83
Pineville	2 77	3 25	3 00	3 20
Pittsboro	2 60	3 30	4 10	3 30
Polkton	2 40	3 00	2 20	3 00
Raleigh	2 56	2 83	3 40	2 83
Reidsville	3 00	2 96	3 40	2 36
Rockingham	2 10	3 00	3 80	3 00
Rocky Mount	2 20	2 50	3 40	2 50
Ruffin	3 28	2 80	3 40	2 20
Rural Hall	3 28	3 20	3 60	3 20
Rutherfordton	3 05	3 65	3 05	3 65
Salisbury	3 25	3 20	3 20	3 20
Sanford	2 10	3 00	3 40	3 00
Selma	2 10	2 80	3 20	2 80
Shelby	2 90	3 60	3 90	3 60
Siler City	2 60	3 60	3 80	3 60
Smithfield	2 20	2 80	3 20	2 80
Statesville	3 50	3 20	3 60	3 20
Stem	2 95	2 83	3 80	2 83
Tarboro	2 30	2 40	3 00	2 40
Waco	2 90	3 60	3 40	3 60
Wadesboro	2 30	3 00	2 50	3 00
Walnut Cove	3 00	3 00	3 40	3 00
Warrenton	3 05	3 25	4 10	3 25
Warsaw	1 50	3 00	3 20	3 00
Washington	2 65	1 75	2 25	1 50
Weldon	2 95	1 90	3 85	1 90
Wilson	2 00	2 60	3 20	2 60
Winston-Salem	3 00	3 00	3 40	3 00

8785	Chickamunga Fertilizer Works, Chattanooga, Tenn.	Chickamunga Standard Wheat Grower.	Morganon.	7 92	1 02	.56	1 58	1 92	2 12	15 62
8687	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano.	Siler City.	7 99	1 20	.50	1 70	2 07	2 03	16 05
8717	Farmers Guano Co., Raleigh, N. C.	State Standard Guano.	Waynesville.	7 82	80	.94	1 74	2 11	2 43	16 50
8573	Martin, D. B., Co., Richmond, Va.	Martin's Old Virginia Favorite.	High Point.	7 43	.62	.86	1 48	1 80	2 25	14 93
8689	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Success Fertilizer.	Siler City.	8 34	1 20	.54	1 74	2 11	2 14	16 65
8672	Miller Fertilizer Works, Baltimore, Md.	Ammoniated Dissolved Bone.	High Point.	8 22	.98	.66	1 64	1 99	2 22	16 24
8690	Navassa Guano Co., Wilmington, N. C.	Navassa Grain Fertilizer.	Goldston.	8 34	1 02	.52	1 54	1 87	2 40	16 15
8698	Norfolk Guano Co., Norfolk, Va.	Oriana Crop Grower.	Troy.	8 34	.66	.82	1 48	1 80	2 15	15 84
8682	Patapasco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano.	Taylorsville.	8 36	1 10	.58	1 68	2 04	1 99	16 26
8631	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Bone and Peruvian Mixture.	Burlington.	9 17	.22	1 06	1 28	1 56	1 70	15 11
8772	Pocahontas Guano Co., Lynchburg, Va.	Banner Brand High Grade Soluble Guano.	Semora.	8 09	.80	.68	1 48	1 80	1 97	15 22
8618	Pocomoke Guano Co., Norfolk, Va.	Parmlco Superphosphate.	Mebane.	8 44	.72	.96	1 68	2 04	2 14	16 50
8701	Rasin-Monumental Co., Baltimore, Md.	Rasin's Empire Guano.	Troy.	9 21	.98	.84	1 82	2 21	1 85	17 42
8700	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer.	Astboro.	9 05	.74	1 02	1 76	2 14	2 09	17 31
8686	Royster, F. S., Guano Co., Norfolk, Va.	Farmers Bone Fertilizer.	Siler City.	8 26	1 18	.50	1 68	2 04	2 09	16 28
8719	do.	Royster's Special Wheat Fertilizer.	Swannanoa.	8 18	1 20	.56	1 76	2 14	1 88	16 29
8676	Swift Fertilizer Works, Atlanta, Ga.	Swift's Red Steer Guano.	Randleman.	8 20	.82	.52	1 34	1 63	1 98	14 78
8619	Tuscarora Fertilizer Co., Atlanta, Ga.	Tuscarora Standard.	Mebane.	9 47	.52	1 24	1 76	2 14	1 91	17 49
8677	Union Guano Co., Winston-Salem, N. C.	Old Homesty Tobacco Guano.	Randleman.	9 20	1 02	.68	1 70	2 07	1 61	16 68
8720	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer.	Asheville.	9 37	.72	1 00	1 72	2 09	1 99	17 33
8760	do.	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Hickory.	8 87	.78	.66	1 44	1 75	1 73	15 50
8620	do.	Davie & Whittle's Owl Brand Guano.	Mebane.	8 88	.98	.72	1 70	2 07	2 11	16 95
8650	do.	Old Dominion Guano Co.'s Soluble Guano.	Liberty.	9 20	.98	.76	1 74	2 11	1 77	17 09
8763	do.	Tinsley & Co.'s Stonewall Guano.	Kenly.	9 17	.66	.72	1 38	1 68	1 86	15 68
8660	do.	Travers & Co.'s Beef, Blood and Bone Fertilizer.	Wilkesboro.	9 95	1 02	.61	1 66	2 02	1 70	17 17
8688	do.	Travers & Co.'s National Fertilizer.	Goldsboro.	8 32	.81	.56	1 40	1 70	2 71	17 94

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.						Total Potash.	Relative Value per Ton at Factory.
				Available Phosphate Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.			
MIXED FERTILIZERS.											
Brands claiming											
8663	Patapsco Guano Co., Baltimore, Md.	Unicorn Guano	Wilkesboro	8.00			2.06	2.50	3.00	\$ 18.53	
8753	Swift Fertilizer Works, Atlanta, Ga.	Swift's Special Blood Guano for Cotton.	Mount Olive	8.32	1.36	.56	1.92	2.33	3.46	18.78	
Brand claiming											
8611	Hadley, Harris & Co., Wilson, N. C.	Hadley's Boss	Wilson	8.88	1.16	.66	1.82	2.21	2.67	18.03	
Brands claiming											
8640	Columbia Guano Co., Norfolk, Va.	Hyco Tobacco Guano	Wilson	8.00	1.06	1.11	2.20	2.67	2.44	18.80	
8748	do.	Olympia Cotton Guano	Hickory	8.15	1.52	1.18	2.70	3.28	2.75	20.89	
8716	Farmers Guano Co., Raleigh, N. C.	Golden Grade Guano.	Waynesville	8.41	1.50	.82	2.32	2.82	2.47	19.33	
8731	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer	Shelby	8.25	.72	1.56	2.28	2.77	2.51	19.08	
8675	Royster, F. S., Guano Co., Norfolk, Va.	Marlboro High Grade Cotton Grower.	Salisbury	8.94	1.30	.94	2.24	2.72	2.92	19.99	
8742	Southern Cotton Oil Co., Rocky Mount, N. C.	Edgerton's Old Reliable	Faison	8.08	1.84	.60	2.44	2.97	2.92	20.00	
8754	Swift Fertilizer Works, Atlanta, Ga.	Swift's Ruralist High Grade Guano	Mount Olive	8.75	.90	1.16	2.36	2.87	2.80	20.16	
8661	Union Guano Co., Winston-Salem, N. C.	Union Homestead Guano.	Statesville	8.17	1.52	.90	2.42	2.94	2.58	19.63	
8759	Val-Car. Chemical Co., Richmond, Va.	Adams' Special	Smithfield	9.74	1.54	.55	2.10	2.55	2.86	20.10	
8756	do.	Diamond Cotton-seed Meal Guano	Smithfield	8.80	.72	1.18	1.90	2.31	2.89	18.51	
8760	do.	Durham Fert. Co.'s Gold Medal Brand Guano.	Smithfield	8.95	.82	1.30	2.12	2.58	3.44	20.11	
			Smithfield	8.20	1.52	.74	2.26	2.75	2.91	19.39	

8762	---do---	Norfolk and Carolina Chem. Co.'s Amazon High Grade Manure.	Smithfield	8 34	1 60	78	2 38	2 89	2 91	19 99
8761	---do---	Old Dominion Guano Co.'s Farm- ers' Friend H. G. Fertilizer.	Smithfield	8 91	1 10	1 00	2 10	2 55	2 97	19 47
8758	---do---	Special High Grade Tobacco Fer- tilizer.	Smithfield	8 84	86	1 20	2 06	2 50	2 81	19 08
Brands claiming										
8741	Pearsall & Co., Wilmington, N. C.	Pearsall's Bone Meal and Fish for Tobacco and Cotton.	Warsaw	7 04	1 16	1 32	2 78	3 38	3 91	21 48
8743	Va.-Car. Chemical Co., Richmond, Va.	Southern Cotton Oil Co.'s Special Mixture.	Faison	8 60	1 34	1 62	2 96	3 60	3 46	23 09
8755	---do---	V.-C. C. Co.'s Special.	Mount Olive	8 98	1 46	1 36	2 82	3 43	4 16	23 66
Brand claiming										
8613	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Best Guano	Wilson	7 92	58	2 30	2 88	3 30	5 01	23 06
Brand claiming										
8691	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Superphosphate	Siler City	8 50			1 65	2 00	2 00	16 25
Brands claiming										
8729	American Fertilizer Co., Norfolk, Va.	American Bone Mixture	Shelby	8 65	38	52	90	1 09	1 87	13 35
8784	Chickamauga Fertilizer Works, Chat- tahoochee, Tenn.	Chickamauga Blood, Bone and Tankage Guano.	Morganston	8 58	42	64	1 06	1 29	2 20	14 28
8794	Va.-Car. Chemical Co., Richmond, Va.	Albison & Addison's Giant Grain and Grass Grower.	Brown Summit	9 46	52	40	92	1 12	1 81	14 09
Brands claiming										
8616	Armour Fertilizer Works, Atlanta, Ga.	Armour's Grain Grower Fertilizer.	Mebane	9 80	30	70	1 00	1 22	2 90	15 91
8786	Patapsco Guano Co., Baltimore, Md.	Coon Brand Guano	Forest City	9 22	76	30	1 06	1 29	2 88	15 60
8699	---do---	do	Pittsboro	9 14	56	38	94	1 14	3 11	15 35
8787	Va.-Car. Chemical Co., Richmond, Va.	Biselow's Crop Guano	Rutherfordton	10 26	34	46	80	97	3 13	15 80
Brand claiming										
8775	Va.-Car. Chemical Co., Richmond, Va.	Albison & Addison's Star Brand Guano.	Durham	9 52	84	66	1 50	1 52	1 01	15 53
Brand claiming										
8757	Va.-Car. Chemical Co., Richmond, Va.	Prolific Cotton Grower	Kenly	10 34	46	1 46	1 92	2 33	1 52	18 47
Brand claiming										
8710	Royster, F. S., Guano Co., Norfolk, Va.	Blood Tankage	Cameron	1 85			10 00	12 16		40 67
				3 21	16	8 72	8 98	10 92		37 91

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.		Total Potash.
MIXED FERTILIZERS.									
Brand claiming									
8629	Canton Fertilizer Co., Canton, Ga.	Quickstep Wheat and Grain Grower.	Murphy	10 00			82	1 00	3 00 \$ 15 48
Brands claiming									
8647	Acme Mfg. Co., Wilmington, N. C.	Acme Bone and Potash.	Walnut Cove	10 00					3 79 15 65
8733	American Fertilizer Co., Norfolk, Va.	American Special Potash Mixture for Wheat.	Shelby	10 00	18	66	84	1 03	4 00 11 60
8628	Armour Fertilizer Works, Atlanta, Ga.	Armour's Phosphate and Potash Fertilizer, No. 3.	Hillsboro.	8 00					4 07 12 17
8634	Canton Fertilizer Co., Canton, Ga.	Dissolved Bone and Potash	Murphy	8 55					3 21 11 39
8737	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Buncombe Corn Grower	Gastonia	8 73					3 54 11 35
8725	Farmers Guano Co., Raleigh, N. C.	Special Bone and Potash Mixture.	Waynesville	8 29					4 04 13 78
8643	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 8 and 4 Bone and Potash Mixture.	Rural Hall	9 26					3 72 12 79
8644	Union Guano Co., Winston-Salem, N. C.	Union Wheat Mixture.	Rural Hall.	9 67					3 60 11 61
8696	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Carr's Special Wheat Guano.	Goldston	8 50					3 85 11 62
8732	do	do.	Iron Station	8 21					4 03 11 78
8642	do	Old Dominion Guano Co.'s Miller's Special Wheat Mixture.	Greensboro	8 17					3 78 12 37
Brands claiming									
8723	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Special Wheat Grower.	Asheville.	9 13					3 89 11 25
8655	Conestee Chemical Co., Wilmington, N. C.	Conestee Bone and Potash.	Liberty	7 75					4 16 12 94
8781	Farmers Guano Co., Raleigh, N. C.	Century Bone and Potash.	Roxboro.	9 29					2 00 11 20
				10 00					2 02 10 73
				9 45					2 71 12 40
				10 47					2 26 11 24
				9 73					

8780	Martin, D. B., Co., Baltimore, Md.	Martin's Potash and Soluble Bone Abattoir Product.	Roxboro.	9 77	2 36	11 39
8846	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone with Potash.	Mount Airy.	10 45	1 62	11 19
8789	Patapsco Guano Co., Baltimore, Md.	Patapsco Soluble Phosphate and Potash.	Eves Siding.	9 70	2 01	10 94
8766	Pocahontas Guano Co., Lynchburg, Va.	Carrington's Superior Grain Compound.	Ruffin.	10 85	1 75	11 69
8631	Pocomoke Guano Co., Norfolk, Va.	Potash Mixture.	Sylva.	9 99	1 97	11 16
8722	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Swannanoa.	10 03	1 77	10 97
8665	Swift Fertilizer Works, Atlanta, Ga.	Standard Grade Swift's Wheat Grower.	Elkin.	10 00	2 24	11 46
8682	Union Guano Co., Winston-Salem, N. C.	Union Bone and Potash.	High Point.	12 88	86	12 54
8788	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's McGavock's Special Potash Mixture.	Marion.	11 02	1 78	11 85
8776	do.	Davie & Whittle's Owl Brand Acid Phosphate with Potash.	Semora.	10 00	3 71	13 08
8624	do.	Durham Fertilizer Co.'s Bone and Potash Mixture.	Hillsboro.	11 02	2 19	12 33
8712	do.	do.	Henderson.	10 87	1 88	11 85
8652	do.	Lynchburg Guano Co.'s S. W. Spill Bone and Potash Mixture.	Liberty.	11 52	3 34	14 04
8630	do.	Owl Brand Acid Phosphate with Potash.	Dillsboro.	9 99	1 48	10 62
8679	do.	Southern Chemical Co.'s Mammoth Wheat and Grass Grower.	Salisbury.	9 82	1 67	10 67
8721	do.	Special Potash Mixture.	Swannanoa.	10 91	1 98	12 00
8641	do.	Tinsley & Co.'s Bone and Potash Mixture.	Pilot Mountain.	11 19	1 54	11 76
8702	do.	Travers & Co.'s Capital Bone and Potash Mixture.	Pittsboro.	10 65	2 10	11 89
Brand claiming				10 50	1 50	11 10
8625	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Great Wheat and Corn Grower.	Burlington.	11 02	1 46	11 52
Brand claiming				10 50	2 25	11 92
8654	Miller Fertilizer Co., Baltimore, Md.	Corn and Wheat Grower.	Burlington.	10 77	2 35	12 28
Brand claiming				10 00	3 00	12 30
8703	Union Guano Co., Winston, N. C.	Union Guano Co.'s Giant Phosphate and Potash.	Ashboro.	9 70	2 73	11 73
Brand claiming				10 00	4 00	13 40
8734	American Fertilizer Co., Norfolk, Va.	Double Dissolved Bone and Potash.	Sheddy.	8 45	3 41	11 35

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.					Total Potash.	Relative Value per Ton at Factory.	
				Available Phosphate.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.			
MIXED FERTILIZERS.											
	Brands claiming			10 00					4 00	\$ 13 40	
8827	Armour Fertilizer Works, Atlanta, Ga.	Armour's Superphosphate and Potash.	Mebane.	10 09					3 75	13 20	
8826	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Alkaline.	Mebane.	10 14					3 70	13 20	
8833	Canton Fertilizer Co., Canton, Ga.	Special Potash Mixture.	Murphy.	10 88					3 77	13 94	
8735	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Special Caraleigh Bone and Potash Mixture.	Gastonia.	10 57					3 79	13 68	
8932	do.	Special Bone and Potash Mixture.	Waynesville.	10 59					3 36	13 23	
8724	Farmers Guano Co., Raleigh, N. C.	do.	Waynesville.	8 48					5 28	13 44	
8651	Imperial Co., Norfolk, Va.	Catawba Wheat Grower.	Greensboro.	9 96					4 76	11 20	
8685	Martin, D. B., Co., Baltimore, Md.	Martin's Potash and Soluble Bone.	Randleman.	11 84					2 74	13 67	
8704	Miller Fertilizer Co., Baltimore, Md.	Miller Fert. Co.'s 10 and 4 Per Cent.	Pittsboro.	13 90					1 52	14 18	
8705	Norfolk Guano Co., Norfolk, Va.	Oriana Wheat Grower.	Troy.	11 21					3 14	13 51	
8956	Pocahontas Guano Co., Lynchburg, Va.	Wabash Wheat Mixture.	Taylorsville.	9 99					3 53	10 87	
8779	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 10 and 4 Bone and Potash Mixture.	Sentora.	19 88					3 77	13 04	
8645	Swift Fertilizer Works, Atlanta, Ga.	Swift's Farmers' Home H. G. Phosphate and Potash.	Mount Airy.	10 83					3 75	13 87	
8778	do.	do.	Roxboro.	10 78					3 71	13 75	
8654	Tuscarora Fertilizer Works, Atlanta, Ga.	Tuscarora Acid and Potash.	Elkin.	10 82					3 80	13 92	
8683	Union Guano Co., Winston, N. C.	Quaker Grain Mixture.	Salisbury.	10 13					3 30	12 75	

8653	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Special Potash Mixture.	Gibsonville.	11.42	3.55	14.18
8777	do.	V.-C. Fertilizer Co.'s XX Potash Mixture.	Durham.	10.93	3.73	13.94
Brand claiming						
8684	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Standard Bone and Potash.	Greensboro.	10.54	5.00	14.50
Brand claiming						
8735	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Horne & Son's High Grade Bone and Potash.	Gastonia.	11.00	5.00	15.40
Brand claiming						
8680	Va.-Car. Chemical Co., Richmond, Va.	Goodman's Special Potash Mixture.	Greensboro.	12.00	5.00	16.30
				12.73	5.64	17.66

RAW OR UNMIXED FERTILIZER MATERIALS.

Brands claiming						
8727	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Dissolved Bone.	Asheville.	12.00		9.60
8738	do.	Royster's Acid Phosphate.	Iron Station.	13.09		10.47
8656	do.	Southern Chemical Co.'s Tar Heel Acid Phosphate.	Burlington.	11.79		9.43
Brands claiming						
8740	American Fertilizer Co., Norfolk, Va.	Eagle Brand Acid Phosphate.	Shelby.	13.78		11.02
8622	Armour Fertilizer Works, Atlanta, Ga.	Armour's Acid Phosphate Fertilizer.	Melbane.	13.09		10.40
8671	Atlantic Chemical Co., Norfolk, Va.	Dissolved Bone.	Elkin.	14.39		11.51
8636	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Acid Phosphate.	Waynesville.	13.74		10.99
8768	Farmers Guano Co., Raleigh, N. C.	Farmers' Acid Phosphate.	McLeansville.	13.59		10.80
8935	Va.-Car. Chemical Co., Richmond, Va.	Durham Fert. Co.'s Double Bone Phosphate, Extra Strong.	Golston.	14.83		11.86
Brands claiming						
8649	American Fertilizer Co., Norfolk, Va.	High Grade Acid Phosphate.	Rural Hall.	13.87		11.10
8726	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s High Grade Acid Phosphate.	Asheville.	14.60		11.68
8638	Canton Fertilizer Co., Canton, Ga.	High Grade Dissolved Bone.	Murphy.	14.00		11.20
				14.52		11.62
				14.43		11.54
				13.84		11.07

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.					Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.		Total Potash.
RAW OR UNMINED FERTILIZER MATERIALS.									
Brands claiming									
8715	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Clinax Dissolved Bone	Warrenton	14 00					\$ 11 20
8790	Chickamauga Fertilizer Works, Chattanooga, Tenn.	Chickamauga High Grade Dissolved Bone, Acid Phosphate	Morganton	14 28					11 42
8708	Miller Fertilizer Co., Baltimore, Md.		Pittsboro	11 18					11 34
8791	Palapasco Guano Co., Baltimore, Md.	Palapasco Pure Dissolved S. C. Phosphate.	Evesiding	15 25					12 20
8635	Pocomoke Guano Co., Norfolk, Va.	Peerless Acid Phosphate	Sylvia	14 11					11 29
8658	Robertson Fertilizer Co., Norfolk, Va.	Scepter Brand Acid Phosphate	Gibsonville	15 76					12 61
8669	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Acid Phosphate	Statesville	14 39					11 51
8776	Union Guano Co., Winston-Salem, N. C.	Union High Grade Acid Phosphate	Reidsville	14 54					11 63
8771	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate, V.-C. Co.'s 14 Per Cent Acid Phosphate.	Leaksville	16 47					13 18
8713	do		Henderson	15 19					12 39
				14 84					11 87
Brands claiming									
8623	Armour Fertilizer Works, Atlanta, Ga.	Armour's Acid Phosphate	Mebane	16 00					12 80
8670	Raugh & Sons Co., Philadelphia, Pa.	Raugh's 16 Per Cent Acid Phosphate.	Statesville	16 07					12 86
8637	Canton Fertilizer Co., Canton, Ga.	High Grade Dissolved Bone	Murphy	17 74					14 19
8659	Conestee Chemical Co., Wilmington, N. C.	Conestee 16 Per Cent Acid Phosphate.	Liberty	16 82					13 46
8767	Farmers Guano Co., Raleigh, N. C.	16 Per Cent Acid Phosphate	McLaurinburg	15 67					12 54

8709	Miller's Fertilizer Co., Baltimore, Md.	Acid Phosphate.	Pittsboro	15 75	12 60
8702	Navassa Guano Co., Wilmington, N. C.	Navassa 16 Per Cent Acid Phosphate.	Goldston	15 76	12 61
8707	Norfolk Guano Co., Norfolk, Va.	Oriana 16 Per Cent Acid Phosphate.	Troy	17 00	13 60
8709	Pocahontas Guano Co., Lynchburg, Va.	Carrington's S. C. Phosphate, Waukesha Brand.	McLaurinburg	15 42	12 34
8706	Rasin-Monumental Co., Baltimore, Md.	Rasin's 16 Per Cent Acid Phosphate.	Troy	16 55	13 24
8739	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate	Shelby	16 50	13 20
8792	Swift Fertilizer Works, Wilmington, N. C.	Swift's Special High Grade Acid Phosphate.	Rutherfordton	15 36	12 29
8608	Tuscarora Fertilizer Co., Atlanta, Ga.	Tuscarora Acid Phosphate.	Statesville	16 76	13 41
8794	Va.-Car. Chemical Co., Richmond, Va.	Dayie & Whittle's Owl Brand High Grade Acid Phosphate.	Rutherfordton	16 27	13 02
8694	do.	Durham Fertilizer Co.'s Durham Root Acid Phosphate.	Goldston	16 36	13 09
8657	do.	Southern Chemical Co.'s Corned 16 Per Cent Acid Phosphate.	Liberty	16 33	13 06
8693	do.	S. W. Travers & Co.'s Champion Acid Phosphate.	Goldston	16 27	13 02
8714	do.	V.-C. C. Co.'s 16 Per Cent Acid Phosphate.	Henderson	15 68	12 34
8667	do.	Va. State Fertilizer Co.'s Bull Run Acid Phosphate.	Wilkesboro	16 81	13 15
Brand claiming				17 00	13 60
8648	Tuscarora Fertilizer Co., Atlanta, Ga.	Tuscarora	Walnut Cove	18 29	14 63
Brands claiming				12 00	12 00
8793	Union Guano Co., Winston-Salem, N. C.	Genuine German Kainit	Newton	11 82	11 82
8697	Va.-Car. Chemical Co., Richmond, Va.	do.	Siler City	12 66	12 66
Brand claiming				48 00	48 00
8611	Union Guano Co., Winston-Salem, N. C.	Sulphate of Potash	Louisburg	47 35	47 35

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1910.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.						Relative Value per Ton at Factory.
				*Total Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	
RAW OR UNMIXED FERTILIZER MATERIALS.										
S751	Brand claiming American Agricultural Chemical Co., New York, N. Y.	Pure Ground Bone	Hickory	20.59			3.70	4.50		\$ 27.73
				21.95			3.56	4.33	28.18	
S765	Brand claiming Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Bone Meal	Leaksville	21.00			3.29	4.00		25.60
				22.25			3.74	4.53	29.04	
S821	Brand claiming Baugh & Sons Co., Norfolk, Va.	Baugh's Raw Bone Meal	Hillsboro	21.50			3.70	4.50		28.37
				21.28			3.86	4.69	28.79	
S878	Brand claiming Union Guano Co., Winston-Salem, N. C.	Pure Raw Bone Animal Meal	Salisbury	22.50			3.71	4.50		29.11
				19.85			3.78	4.69	27.50	
S840	Brands claiming Peruvian Guano Co., Charleston, S. C.	Genuine Peruvian Guano	Mount Airy	12.00			2.80	3.40	2.00	21.52
				14.33			3.06	3.72	1.40	23.50

*Total Phosphoric Acid in Bone Meal, Peruvian Guano and Thomas Phosphate valued at 3½ cents per pound.

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Chlorine.	Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Murate.	Potash from Sulphate.					
MIXED FERTILIZERS.																
Brands claiming				8.00			82	1.00	3.00						\$13.94	
9872	American Agricultural Chemical Co., New York, N. Y.	Fidelity Crop Grower	Greensboro	8.92	.65	.54	1.22	1.48	3.41						16.90	
9685	Armour Fertilizer Works, Wilmington, N. C.	Armour's Grain Grower	Gibsonville	9.17	.26	.68	.94	1.14	2.74						15.21	
9302	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Comet Guano	Lexington	8.64	.22	.48	.70	.85	3.46						14.52	
9326	Union Guano Co., Winston, N. C.	Sunrise Ammoniated Guano	Hickory	10.39	.70	.34	1.04	1.26	2.58						16.56	
Brands claiming				8.00			82	1.00	4.00						15.04	
9341	Ober, G., & Sons Co., Baltimore, Md.	Ober's Stag Guano	Apex	8.41	.26	.88	1.14	1.39	5.56						20.47	
9532	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Farmers' Favorite	Edenton	8.24	.22	.64	.86	1.05	5.20						16.75	
Brand claiming				8.00			1.00	1.22	3.00						14.70	
9564	Baugh & Sons Co., Norfolk, Va.	Baugh's Southern States Excel-sior Guano.	Edenton	8.84	.72	.52	1.24	1.51	2.97						16.43	
Brand claiming				8.00			1.00	1.22	4.00						15.83	
9423	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Wheat, Corn and Peanut Manure.	Cherryville	8.72	.52	.52	1.04	1.26	3.83						16.40	
Brand claiming				8.00			1.03	1.25	4.00						15.93	
9741	Martin, D. B., Co., Richmond, Va.	Martin's Peanut Grower	Hertford	8.79	.62	.48	1.10	1.34	3.13						15.97	
Brand claiming				8.00			1.65	2.00	1.50						15.83	
9899	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture	Shelby	9.25	1.02	.56	1.58	1.92	1.51						16.62	

ANALYSES OF COMMERCIAL FERTILIZERS SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.							Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Murate.		Potash from Sulphate.	(Chlorine.
MIXED FERTILIZERS.												
Brands claiming												
9701	Acme Fertilizer Co., Wilmington, N. C.	Gen Fertilizer	Jonesboro	8 00			1 65	2 00	2 00			\$16 34
8868	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano	Wadesboro	8 12	.90	.88	1 78	2 16	2 19			17 19
9118	do	A. L. Hamall's Special Formula.	Dunn	8 70	.86	.76	1 62	1 97	2 42			17 30
9586	American Agricultural Chemical Co., Baltimore, Md.	Zell's Calvert Guano	Siler City	8 21	1 04	.56	1 60	1 94	2 71			17 11
9313	do	Zell's Fish Guano	Edenton	8 50	1 34	.60	1 91	2 36	2 26			18 28
9518	Armour Fertilizer Works, Atlanta, Ga.	Armour's General Fertilizer	Bryson City	8 15	1 21	.46	1 70	2 07	1 99			16 93
9246	Armour Fertilizer Works, Wilmington, N. C.	Armour's Slaughter-house Fertilizer.	Roseboro	7 97	1 10	.58	1 68	2 01	1 97			16 39
4622	do	do	Lucama	7 62	.78	.91	1 72	2 09	2 08			16 37
9160	Arps, Geo. L., & Co., Norfolk, Va.	Arps' Peruvian Guano for Tobacco and All Spring Crops.	Edenton	8 37			1 74	2 11	1 97			17 02
9672	Ashepoo Fertilizer Co., Charleston, S. C.	Standard Carolina Guano	Lexington	8 14	1 10	.56	1 66	2 02	2 15	5 52		16 66
9262	do	Standard Entaw XX Guano	Monroe	9 08	1 16	.52	1 68	2 01	2 32			18 32
9719	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Complete Fertilizer.	Asheville	9 37	1 05	.72	1 78	2 16	2 23			18 36
9425	Atlantic Chemical Co., Norfolk, Va.	Atlantic Soluble Guano	Kings Mountain	6 83	.36	1 12	1 48	1 80	1 84			14 17
9576	Bailey, John L., Co., Elm City, N. C.	Stag Brand Fertilizer	Westrys	8 10	1 05	.62	1 68	2 04	2 13			16 69
9884	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Base and Potash Compound for All Crops.	Winston	8 32	1 12	.76	1 88	2 29	2 49			18 12
9082	do	do	High Point	8 52	1 05	.71	1 80	2 19	1 85			17 26
				8 29	.58	1 16	1 71	2 11	2 05			17 03

9187	do	do	do	8.04	1.34	1.08	2.42	2.91	3.01	20.71
8858	do	Baugh's Fish Mixture	Hertford	7.99	1.06	.82	1.88	2.29	1.97	17.25
9376	Berkley Chemical Co., Norfolk, Va.	Brandon Superphosphate	Lillington	8.81	1.22	.54	1.76	2.14	2.35	17.90
9127	do	Long Leaf Tobacco Grower	Kings Mountain	8.41	1.12	.50	1.62	1.97	1.86	5.96 16.42
9600	Blackstone Guano Co., Blackstone, Va.	Red Letter for Tobacco	Roxboro	8.79	.92	.66	1.58	1.92	2.12	10 2.02 .08 16.88
9132	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Cotton Grower	Concord	9.01	.91	.62	1.56	2.02	1.95	16.80
8960	do	Bryant's Cotton-seed Meal	Lumberton	7.91	.22	1.41	1.66	2.02	2.02	16.31
9485	do	Bryant's Potomac Bone Special for Tobacco	Semora	7.78	1.32	.70	2.02	2.47	2.12	2.06 .36 1.55 18.15
9412	do	Bryant's Special Fertilizer	Ashboro	9.14	.90	.71	1.64	1.99	2.30	17.64
9702	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Butcher Bone	Jonesboro	7.92	1.20	.62	1.82	2.24	2.24	17.24
9548	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Fertilizer	Waynesville	7.79	.78	.90	1.68	2.04	2.25	16.51
9006	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano	Moore'sville	7.95	1.14	.70	1.84	2.24	2.09	17.18
9276	do	do	Fountain	8.17	1.10	.58	1.68	2.01	2.03	16.61
9613	Cooper Guano Co., Wilmington, N. C.	Cooper's Reward	Mount Tabor	7.89	.90	1.72	2.62	3.19	1.96	20.26
8925	do	Cooper's Sterling Complete Guano	Wilmington	9.36	1.12	.52	1.64	1.99	2.41	18.00
9776	Craven Chemical Co., New Bern, N. C.	Elite Cotton Guano	Pattlesboro	9.21	.31	1.68	2.02	2.47	1.84	18.82
9291	Crow Fertilizer Co., Monroe, N. C.	Crow's Union County Special	Monroe	7.76	.08	1.50	1.58	1.92	4.22	18.26
9459	Eastern Cotton Oil Co., Hertford, N. C.	Perquinians Favorite	Windsor	8.58	.18	1.14	1.62	1.97	2.81	17.65
9755	Farmers Cotton Oil Co., Wilson, N. C.	Crop King Guano	Middlesex	7.31	1.30	.98	2.28	2.77	2.17	18.87
8968	do	Farmers' Special Guano	Fayetteville	7.22	.72	1.22	1.94	2.36	2.92	17.86
8821	Farmers Guano Co., Raleigh, N. C.	State Standard Guano	Mount Gilcard	8.54	.96	.86	1.82	2.21	2.43	18.00
9112	Fremont Oil Mill Co., Fremont, N. C.	Up-to-date	Fremont	8.18	.78	1.12	1.90	2.31	2.22	17.78
9622	Georgia Chemical Works, Augusta, Ga.	Georgia Formula	Lawndale	8.76	.51	1.10	1.60	1.91	2.02	16.99
8914	Hampton Guano Co., Norfolk, Va.	Shirley Superphosphate	Clinton	8.54	1.02	.52	1.54	1.87	3.31	17.79
8861	Harrell, S. B., & Co., Norfolk, Va.	Harrell's Champion Cotton and Peanut Guano	Edenton	8.11	1.14	.56	1.70	2.70	1.93	16.87
9450	Holmes & Dawson, Norfolk, Va.	Triumph Soluble Guano	Windsor	8.52	1.10	.50	1.60	1.91	1.98	16.57

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.										Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	(Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.														
	Brands claiming			8.00			1.65	2.00	2.00					\$16.34
8809	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Exchange Guano	New Bern	7.49	.74	1.04	1.78	2.16	2.49					16.95
9214	Imperial Fertilizer Co., Norfolk, Va.	Champion Guano	Mount Gilthead	8.42	1.24	.50	1.74	2.11	2.00					17.09
9293	do	Imperial Cotton Grower	Wadesboro	8.52	1.18	.54	1.72	2.09	2.13					17.23
9294	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Success Fertilizer	Monroe	8.88	1.22	.56	1.78	2.16	2.10					17.78
8813	Martin, D. B., Co., Richmond, Va.	Martin's Carolina Cotton Fertilizer.	New Bern	8.54	.52	1.22	1.74	2.11	2.06					17.26
9222	Martin & White Co., New Bern, N. C.	Big Crop Grower	Kenly	8.55	.56	1.08	1.64	1.99	2.04					16.83
9793	MacMurphy Co., Charlotte, N. C.	Special Cotton and Corn Grower	Wadesboro	8.18	.94	.92	1.86	2.26	2.73					18.18
9084	Miller Fertilizer Co., Baltimore, Md.	Ammoniated Dissolved Bone	High Point	8.15	1.14	.64	1.78	2.16	2.23					17.26
9397	do	Farmers' Profit	Roxboro	7.88	1.18	.64	1.82	2.21	2.30					17.27
8893	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton Fertilizer	Lumberton	8.37	.60	1.06	1.66	2.02	2.78					17.56
9140	do	Navassa Cotton-seed Meal Guano.	Dunn	8.69	.32	1.30	1.62	1.97	1.79					16.59
9833	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Craven County Guano	Plymouth	8.11	.50	1.28	1.78	2.16	2.52					17.55
9322	do	Greene County Standard Fertilizer.	Snow Hill	9.93	.36	1.14	1.50	1.82	2.61					18.11
9422	N. C. Cotton Oil Co., Charlotte, N. C.	Majestic Fertilizer	Belmont	8.27	.14	1.68	1.82	2.21	1.96					17.24
9272	N. C. Cotton Oil Co., Henderson, N. C.	Franklin's Cotton Grower	Louisburg	7.66	.52	1.24	1.76	2.14	2.20					16.71
8942	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Cotton Grower	Roseboro	8.15	.54	1.44	1.98	2.41	2.40					18.29

9215	Norfolk Fertilizer Co., Norfolk, Va.	Oriana Cotton Guano	Mount Gilead	8 55	1 16	.54	1 70	2 07	2 08	17 12
8986	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special Cotton Com- pound	Cherryville	8 11	.88	82	1 70	2 07	2 04	16 68
9340	-----do-----	Ober's Standard Tobacco Fer- tilizer	Stem	7 84	.96	74	1 70	2 07	1 98	4 78
8904	Pamlico Chemical Co., Washington, N. C.	Pamlico Bone and Fish Guano	Washington	9 24	.68	92	1 60	1 94	3 13	18 48
9004	Patapsco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	Mooresville	8 94	1 40	52	1 92	2 33	2 16	18 49
9070	Pearsall & Co., Wilmington, N. C.	Pearsall's Eagle Guano	Wallace	8 72	.70	1 01	1 74	2 11	2 30	18 00
4306	Piedmont-Mount Airy Guano Co., Bal- timore, Md.	Piedmont Cultivator	Edenton	7 71	-----	1 34	1 63	3 23	-----	16 11
9402	-----do-----	Piedmont Special for Cotton, Corn and Peanuts	Marshville	8 34	.68	1 06	1 74	2 11	2 39	17 44
9081	-----do-----	Red Leaf Tobacco Grower	Burlington	8 38	.74	1 08	1 82	2 21	2 86	8 15
9512	Pine Level Oil Mill Co., Pine Level, N. C.	Cotton Grower Fertilizer for All Crops	Garner	9 92	.88	62	1 50	1 82	2 43	17 90
9060	Pocahontas Guano Co., Lynchburg, Va.	Banner Brand High Grade Sol- uble Guano	Henderson	8 89	1 04	62	1 66	2 02	2 04	17 22
9403	Powhatan Chemical Co., Richmond, Va.	Magie Cotton Grower	Indian Trail	9 81	1 20	76	1 96	2 38	2 16	19 16
9411	-----do-----	Magie Tobacco Grower	Greensboro	8 14	.91	.72	1 66	2 02	2 08	4 38
9303	Rasin-Monumental Co., Baltimore, Md.	Rasin's Empire Guano	Statesville	9 10	.96	62	1 58	1 92	2 00	17 03
9357	Read Phosphate Co., Charleston, S. C.	Read's Blood and Bone Ferti- lizer, No. 1	Morven	7 79	.36	1 26	1 62	1 97	1 90	15 90
9332	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer	Reidsville	8 35	.52	1 14	1 66	2 02	2 29	17 00
9136	Richmond Guano Co., Richmond, Va.	Premium Brand Fertilizer	Concord	7 83	1 08	68	1 76	2 14	2 16	16 79
8983	Robertson Fertilizer Co., Norfolk, Va.	Double Dollar Guano	Mooresboro	8 72	1 03	.50	1 56	1 89	1 79	16 37
4589	-----do-----	do	Littleton	8 22	-----	1 68	2 04	1 95	-----	16 00
9170	Rowan Chemical Co., Salisbury, N. C.	Rowan's Double Quick Guano	Norwood	7 84	.96	.98	1 94	2 36	2 71	18 18
8852	Royster, F. S., Guano Co., Norfolk, Va.	Farmers' Bone Fertilizer	Boston	8 27	1 04	.68	1 72	2 09	2 04	16 81
9168	-----do-----	Royster's Special Wheat Ferti- lizer	Lowesville	8 07	1 18	.56	1 74	2 11	2 11	16 89
9336	Shannonhouse, H. T., Hertford, N. C.	Farmers' Money Maker	Hertford	7 97	.01	1 60	1 61	1 96	2 18	16 33
9739	-----do-----	Square Deal	Hertford	8 25	.62	.86	1 48	1 80	2 04	15 88
9070	Southern Chemical Co., Roanoke, Va.	Our Favorite	Walnut Cove	7 87	1 02	.72	1 74	2 11	2 32	16 04
9582	Southern Cotton Oil Co., Concord, N. C.	Gloria Standard Fertilizer	Siler City	8 90	.42	1 52	1 91	2 36	2 25	18 63

ANALYSES OF COMMERCIAL FERTILIZERS - SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.							Potash from Sulphate.	Potash from Chloride.	Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.				
MIXED FERTILIZERS.													
Brands claiming													
9546	Southern Cotton Oil Co., Davidson, N. C.	Gloria Standard Fertilizer	Canton	8.00	48	1.30	1.78	2.16	2.11	1.65	2.00	2.00	\$16.34
9372	Southern Cotton Oil Co., Fayetteville, N. C.	Standard Fertilizer	Linden	7.92	32	1.26	1.58	1.92	2.42	1.78	2.16	2.11	17.25
9249	Southern Cotton Oil Co., Goldsboro, N. C.	Gloria Standard Fertilizer	Lumberton	8.40	84	1.68	2.04	2.16	2.42	1.58	1.92	2.42	16.86
9075	do	Standard Fertilizer	Mount Olive	8.38	46	1.26	1.72	2.09	2.53	1.68	2.04	2.16	16.97
4437	Southern Cotton Oil Co., Monroe, N. C.	Gloria Standard Fertilizer	Polkton	8.40	68	1.14	1.82	2.21	2.13	1.72	2.09	2.53	17.57
9648	Southern Cotton Oil Co., Shelby, N. C.	Double Two	Shelby	8.91	58	1.12	1.70	2.07	2.65	1.58	1.92	2.19	17.06
9620	do	Gloria Standard Fertilizer	Lattimore	8.29	60	1.14	1.71	2.11	2.12	1.58	1.92	2.65	17.45
9794	Southern Cotton Oil Co., Wadesboro, N. C.	do	Wadesboro	8.09	30	1.68	1.98	2.41	2.80	1.71	2.11	2.12	17.25
8956	Southern Exchange Co., Maxton, N. C.	Coon Guano	Lumberton	8.29	1.02	.56	1.58	1.92	3.16	1.71	2.11	2.12	17.61
9786	Statesville Oil and Fertilizer Co., Statesville, N. C.	Grass-Grass Oil Manipulated Guano	Statesville	8.03	1.04	.72	1.76	2.14	1.91	1.98	2.41	2.80	18.02
9610	Swift Fertilizer Works, Wilmington, N. C.	Swift's Red Steer	Bladenboro	8.07	93	.65	2.58	3.14	2.25	1.76	2.14	1.91	16.75
9008	do	do	Burgaw	9.35	91	.92	1.86	2.26	1.88	2.58	3.14	2.25	21.72
9683	Tuscarora Fertilizer Co., Wilmington, N. C.	Tuscarora Fertilizer	Graham	7.37	1.02	.86	1.88	2.29	2.35	1.86	2.26	1.88	16.51
9171	Union Guano Co., Winston, N. C.	Fish Brand Ammoniated Guano	Albemarle	8.49	88	.78	1.66	2.02	2.40	1.88	2.29	2.35	17.85
9756	do	do	Elm City	8.07	56	1.24	1.80	2.10	2.52	1.66	2.02	2.40	16.87
8838	do	Old Honesty Guano	Wadesboro	8.65	48	1.30	1.78	2.16	2.11	1.80	2.10	2.52	18.12

9117	United States Fertilizer Co., Baltimore, Md.	Farm Bell Standard Guano	Dunn	7 37	78	1 14	1 92	2 33	2 14	17 05
9314	Vance Guano Co., Henderson, N. C.	Hot Stuff	Wake Forest	7 96	94	72	1 66	2 01	2 30	16 67
9552	Venable Fertilizer Co., Richmond, Va.	Venable's Meal Mixture	Waco	7 79	1 40	1 44	2 84	3 45	2 26	21 12
9510	Va.-Car. Chemical Co., Richmond, Va.	Ajax Guano	Lallington	8 30	22	1 52	1 74	2 11	2 50	16 53
9178	do	Allison & Addison's Anchor Brand Fertilizer	Cerro Gordo	8 38	1 14	71	1 88	2 29	2 17	17 82
8801	do	Atlantic and Virginia Fertilizer Co.'s Eureka	Raleigh	9 12	2 02	56	2 58	3 14	2 28	21 55
9108	do	Charlotte Oil and Fertilizer Co.'s King Cotton Grower	Fremont	8 37	1 38	1 22	2 69	3 16	2 08	20 74
9031	do	Davie & Whittle's Owl Brand Guano	Waxhaw	9 51	1 16	56	1 72	2 09	1 95	19 93
9141	do	Diamond Dust	Dunn	8 52	08	1 40	1 48	1 80	1 97	16 05
9031	do	Davie & Whittle's Owl Brand Guano	Waxhaw	9 51	1 16	56	1 72	2 09	1 95	19 93
8954	do	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano	Lumberton	8 92	48	1 30	1 78	2 16	2 07	17 78
8800	do	Farmers' Favorite Fertilizer	Raleigh	8 30	86	1 34	2 20	2 67	2 24	19 28
9529	do	do	Hertford	8 85	1 20	76	1 96	2 38	2 14	18 55
8873	do	Norf. and Car. Chem. Co.'s Gen. Slaughter-house Bone Guano	Wadesboro	8 22	62	1 36	1 98	2 41	2 32	18 27
9299	do	do	Wadesboro	8 86	46	1 02	1 48	1 80	2 72	17 18
9002	do	Old Dominion Guano Co.'s Soluble Guano	Moorestville	9 53	1 00	56	1 56	1 89	1 81	17 12
9086	do	Old Dominion Guano Co.'s Soluble Tobacco Guano	Thomasville	9 37	1 10	81	1 91	2 36	2 23	17 18 03
8916	do	Plant Food	Whiteville	8 39	50	1 26	1 76	2 11	2 67	17 88
9065	do	Powers, Gibbs & Co.'s Eagle Island Ammoniated Guano	Clinton	10 98	60	1 04	1 64	1 99	2 08	19 06
8938	do	Powers, Gibbs & Co.'s C. S. M. Soluble Ammoniated Guano	Roseboro	8 49	28	1 56	1 84	2 24	2 05	17 62
9226	do	Southern Chemical Co.'s Standard Guano	Kendy	8 25	76	64	1 40	1 70	1 91	15 40
9343	do	Tinsley & Co.'s Stonewall Tobacco Guano	Stovall	8 74	98	60	1 58	1 92	1 93	16 62
8921	do	Travers & Co.'s Beef, Blood and Bone Fertilizer	Whiteville	8 64	1 08	61	1 72	2 09	2 08	17 29
9064	do	Travers & Co.'s National Fertilizer	Warsaw	8 43	1 02	64	1 66	2 02	2 18	16 96
9030	do	Virginia State Guano	Waxhaw	9 99	1 06	56	1 62	1 97	1 51	17 45
9575	do	Winston Special for Cotton	Nashville	8 29	14	1 32	1 46	1 78	2 31	16 13

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.								Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
MIXED FERTILIZERS.													
Brands claiming													
9448	Winborne-Brown Guano Co., Norfolk, Va.	Champion Crop Grower	Windsor	8 00	1 10	68	1 78	2 16	5 23				\$16 34
9822	do.	Eureka Guano	Edenton	7 02	94	75	1 70	2 07	2 68				19 50
9208	do.	Excelsior Guano	Edenton	7 94	1 34	69	1 94	2 36	2 63				17 23
9488	Young, J. R., Fertilizer Co., Norfolk, Va.	Young's New Process Guano for Pine-tops Cotton, Corn and Peanuts.	Edenton	7 89	1 10	84	1 94	2 36	2 22				18 14
Brand claiming													
9634	Reidsville Fertilizer Co., Reidsville, N. C.	Broad Leaf Tobacco Guano	Reidsville	8 01	1 10	84	1 94	2 36	2 22				17 80
Brands claiming													
9570	Chesapeake Chemical Co., Baltimore, Md.	C. C. Co.'s Ammoniated Phosphate.	Albokie	8 00			1 65	2 00	2 50				16 88
8810	Hubbard Guano Co., Baltimore, Md.	Hubbard's Fish Compound	New Bern	8 59	64	88	1 92	2 33	3 10	3 10		5 20	19 20
4330	Navassa Guano Co., Wilmington, N. C.	Clark's Special Cotton-seed Meal Guano.	Clarkton	8 00			1 65	2 00	3 00				17 44
9611	do.	Harvest King Guano	Clarkton	6 41	.58	1 09	1 58	1 92	4 25				17 08
8926	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Banner	Wilmington	8 30	88	92	1 80	2 19	3 00				18 33
9235	Pearsall & Co., Wilmington, N. C.	Corn Guano	Wilmington	8 12			1 70	2 07	2 96				17 70
9152	Pocomoke Guano Co., Norfolk, Va.	Crescent Complete Compound	Wilmington	8 29	76	92	1 68	2 04	3 96				18 87
9608	Southern Exchange Co., Maxton, N. C.	Carrie Crop Lifter.	Clarkton	8 17	.78	1 02	1 80	2 19	3 40				18 65
9153	do.	Racer Guano	Clarkton	8 64	1 05	1 24	2 30	2 80	3 60				24 40
				8 15	1 20	.54	1 74	2 11	2 83				17 55
				8 05	1 18	.56	1 74	2 11	2 82				17 65
				8 16	1 30	50	1 80	2 19	2 95				18 15

Brands claiming		8 00	1 65	2 00	4 00	18 53		
9718	Asheville Packing Co., Asheville, N. C. Asheville Packing Co.'s High Grade Fertilizer.	6 90	46	1 62	2 08	2 53	6 60	22 21
9743	Miller Fertilizer Co., Baltimore, Md. Potato and Vegetable Grower	7 92	1 30	70	2 00	2 43	4 64	20 63
9125	Pocomoke Guano Co., Norfolk, Va. Monticello Animal Bone Fertilizer.	9 31	1 21	70	1 94	2 36	1 08	21 01
9888	Southern Chemical Co., Roanoke, Va. Farmers' Joy	8 25	1 14	64	1 78	2 16	4 33	19 66
9561	Upshur, R. L., Guano Co., Norfolk, Va. Upshur's Fish, Bone and Potash Guano.	7 79	1 02	70	1 72	2 09	3 01	17 54
Brands claiming		8 00			1 65	2 00	5 00	19 63
9345	Baugh & Sons Co., Norfolk, Va. Baugh's Complete Animal Base Fertilizer.	8 45	1 16	60	1 76	2 11	4 75	20 22
9749	Rowan Chemical Co., Salisbury, N. C. Rowan Special for Cotton and Tobacco.	8 41	90	64	1 54	1 87	5 05	10 05
Brands claiming		8 00			1 65	2 00	6 00	20 73
9521	Adair, A. D., & McCarty Bros., Charta- Special Potato Grower.	8 25	1 24	68	1 92	2 33	6 67	22 82
9694	Mooga, Tenn. Martin, D. B., Co., Richmond, Va. Privott's Special for Sweet Potatoes and Peanuts.	8 25	86	52	1 38	1 68	5 70	19 49
Brands claiming		8 00			1 65	2 00	10 00	25 13
9592	Armour Fertilizer Works, Wilmington, N. C. High Grade Potato Fertilizer	7 92	94	82	1 76	2 14	8 01	23 33
9583	Union Guano Co., Winston, N. C. Union Potato Mixture	9 67	56	36	92	1 12	7 94	21 30
Brand claiming		8 00			2 06	2 50	1 00	16 95
1419	Navassa Guano Co., Wilmington, N. C. Navassa Universal Fertilizer	9 16			1 94	2 36	1 26	17 78
Brands claiming		8 00			2 06	2 50	2 00	18 05
9186	Columbia Guano Co., Norfolk, Va. Columbia Special Tobacco Guano.	8 17	1 56	58	2 14	2 60	1 97	18 51
9167	Lister's Agricultural Chemical Works, Newark, N. J. Lister's Ammoniated Dissolved Bone Phosphate.	9 06	1 22	86	2 08	2 53	2 08	19 28
8804	Navassa Guano Co., Wilmington, N. C. Ammoniated Soluble Navassa Guano.	9 04	52	1 00	1 52	1 85	2 57	17 35
9259	Va.-Car. Chemical Co., Richmond, Va. Powers, Gibbs & Co.'s Ammoniated Guano.	8 24	1 32	78	2 10	2 55	2 52	18 99
9750	do. Va. State Fertilizer Co.'s Australian Tobacco Grower.	9 76	1 76	60	2 36	2 87	2 83	21 01
Brands claiming		8 00			2 06	2 50	2 50	18 56
9399	American Agricultural Chemical Co., New York, N. Y. Slingluff's British Mixture	8 45	1 56	72	2 58	3 11	2 77	21 21
9643	Josey, N. B., Guano Co., Tarboro, N. C. Josey's Favorite Cotton-seed Meal and Fish Scrap Guano.	9 95	1 30	1 00	2 30	2 80	2 92	21 83

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.										Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	(Chlorine.			
MIXED FERTILIZERS.															
Brands claiming															
9122	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' All Crop Guano	Vanceboro	8 00	-	-	2 06	2 50	2 50	-	-	-	-	-	\$18 56
9682	Pocahontas Guano Co., Lynchburg, Va.	Special Truck Grower, Eagle Mountain Brand.	Gilsonville	8 69	1 10	62	1 72	2 09	4 71	-	-	-	-	-	21 62
Brands claiming															
9243	American Fertilizer Co., Norfolk, Va.	American No. 1 Fertilizer	Roseboro	8 03	86	1 52	2 38	2 89	2 56	-	-	-	-	-	20 26
9385	Armour Fertilizer Works, Wilmington, N. C.	Armour's Sweet Potato Special	Wilmington	8 45	1 00	1 10	2 10	2 55	2 91	-	-	-	-	-	19 15
9671	Atlantic Chemical Co., Norfolk, Va.	Atlantic Tobacco Grower	Stoneville	8 22	1 46	68	2 14	2 60	3 09	3 09	-	-	-	-	21 61
9642	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh Special Tobacco Guano.	Spring Hope	8 08	1 22	1 36	2 18	2 65	2 73	2 73	-	-	-	-	19 62
9832	do	Planters' Pride	Whitchards	7 82	70	1 88	2 58	3 14	3 32	-	-	-	-	-	6 15
9636	Columbia Guano Co., Norfolk, Va.	Royal Tobacco Fertilizer	Greensboro	7 91	1 10	71	2 11	2 60	2 93	2 93	-	-	-	-	6 65
9725	Contentnea Guano Co., Wilson, N. C.	Special Formula Fertilizer	Nashville	8 30	10	2 12	2 22	2 70	3 12	-	-	-	-	-	19 43
9013	Cooper Guano Co., Wilmington, N. C.	Cooper's Bunker Hill	Wallace	8 33	1 32	72	2 04	2 48	2 80	-	-	-	-	-	21 53
8882	Farmers Cotton Oil Co., Wilson, N. C.	Carolina Choice Tobacco Guano	Kinston	7 02	1 46	1 08	2 51	3 09	3 62	3 62	-	-	-	-	6 40
9405	Farmers Guano Co., Raleigh, N. C.	Big Crop Guano	Marshville	8 50	1 16	98	2 11	2 60	2 56	-	-	-	-	-	19 33
8978	do.	Toco Tobacco Guano	Everetts	7 92	60	1 48	2 08	2 53	3 17	3 47	-	-	-	-	20 23
9411	Fremont Oil Mill Co., Fremont, N. C.	Square Deal	Fremont	8 00	94	1 38	2 32	2 82	3 63	-	-	-	-	-	19 14
9106	do.	do	Fremont	7 99	82	1 36	2 18	2 65	3 43	-	-	-	-	-	20 97
															19 45
															20 94
															20 12

9440	Navassa Guano Co., Wilmington, N. C.	Mogul Guano	Lacama	7 21	1 28	.82	2 10	2 55	3 09	18 71
9656	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Onslow Farmers' Reliance Guano.	Edenton	8 64	.36	1 68	2 04	2 48	2 59	19 19
8920	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Tobacco Grower	Wilmington	8 80	.76	1 36	2 12	2 58	3 19	20 33
9317	Pamlico Chemical Co., Washington, N. C.	Farmers' Best Guano	Washington	8 55	.60	1 78	2 38	2 89	3 81	21 88
9641	Patapsco Guano Co., Baltimore, Md.	Patapsco Special Tobacco Mixture.	Rocky Mount	8 27	1 54	74	2 28	2 77	3 33	20 08
9105	do	Unicorn Guano	Fremont	8 03	1 42	74	2 16	2 63	3 48	20 13
9680	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Guano for Tobacco	Burlington	8 88	1 12	1 04	2 16	2 63	3 19	20 51
9877	Poachontas Guano Co., Lynchburg, Va.	Spot Cash Tobacco Compound	Reidsville	8 38	1 14	.61	2 08	2 53	2 97	19 54
9273	do	do	Creedmoor	8 47	1 50	.62	2 12	2 58	2 92	19 74
8851	Powhatan Chemical Co., Richmond, Va.	White Leaf Tobacco Fertilizer	LaGrange	7 70	1 24	.70	1 94	2 36	3 49	18 92
9885	Rasin-Monumental Co., Baltimore, Md.	Rasin's General Tobacco Grower	Winston	8 27	1 66	.88	2 54	3 09	3 11	21 33
8981	Richmond Guano Co., Richmond, Va.	Tip Top Fertilizer	Shelby	8 17	1 42	.62	2 04	2 48	3 29	19 54
8887	Royster, F. S., Guano Co., Norfolk, Va.	Orinoco Tobacco Guano	Kinston	8 00	1 46	.72	2 18	2 65	3 14	19 81
9383	Southern Cotton Oil Co., Charlotte, N. C.	All-to-Good High Grade Fertilizer.	Lumberton	8 20	1 06	1 26	2 32	2 82	3 38	20 54
9155	Southern Cotton Oil Co., Goldsboro, N. C.	Echo	Plymouth	9 00	.46	1 66	2 12	2 58	3 35	20 09
8947	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's 2½-8-3 Guano	Elizabeth City	7 88	.96	1 00	1 96	2 38	2 75	18 35
4172	Va.-Car. Chemical Co., Richmond, Va.	Blue Star C. S. M.	Red Springs	8 49	---	---	2 28	2 77	3 24	20 78
8790	do	do	Raleigh	7 96	.06	1 32	2 10	1 68	3 39	19 71
8918	do	Durham Fertilizer Co.'s Farmers' Alliance Guano.	Whiteville	8 97	.86	1 30	2 16	2 63	3 97	21 51
9824	do	do	Old Trap	7 64	1 81	.50	2 34	2 81	3 18	20 20
9891	do	Norf. and Car. Chem. Co.'s Cooper's Bright Tobacco Fertilizer.	Mount Airy	9 47	1 00	.54	2 14	2 60	3 18	21 01
9100	do	Old Dominion Guano Co.'s Osceola Tobacco Guano.	Fremont	8 24	.62	1 58	2 20	2 67	3 34	20 20
9071	do	Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.	Mount Olive	8 56	1 20	.80	2 00	2 43	3 21	19 63
8941	do	Superlative C. S. M. Guano.	Clinton	8 16	.56	1 52	2 08	2 53	2 81	19 17
Brand claiming				8 00	---	---	2 06	2 50	4 00	20 23
9233	N. C. Cotton Oil Co., Wilmington, N. C.	Currie's Crop Grower	Clarkton	8 80	.78	1 32	2 10	2 55	1 06	21 21

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.										Potash from Sulphate.	Potash from Murate.	Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	(Chlorine.							
MIXED FERTILIZERS.																	
Brands claiming				8 00			2 25	2 75	2 00						\$18 89		
9047	Acme Mfg. Co., Wilmington, N. C.	Acme Cotton Grower.	Goldshoro	9 37	.88	1 24	2 12	2 58	2 12						19 85		
9585	Camp, W. H., Petersburg, Va.	Red Head—Camp's Prepared Chemicals.	Siler City	8 14	1 84	.66	2 50	3 04	3 26						21 41		
9736	Farmville Oil and Fertilizer Co., Farmville, N. C.	Chambliss & Sons' Special C. S. M.	Zebulon	8 37	1 16	2 01	3 20	3 89	2 75						24 00		
9467	N. C. Cotton Oil Co., Henderson, N. C.	Brewer's Special.	Wake Forest.	7 75	1 72	.58	2 30	2 80	2 22						19 08		
9198	N. C. Cotton Oil Co., Raleigh, N. C.	Raleigh Standard Guano.	Clayton	8 31	82	1 42	2 24	2 72	2 03						19 12		
9015	Val-Car, Chemical Co., Richmond, Va.	Best's Special Cotton Grower	Goldshoro	9 77	50	1 82	2 32	2 82	2 19						20 91		
8798	do	Royal Crown	Raleigh	8 34	1 26	.94	2 20	2 67	2 00						18 95		
Brand claiming				8 00			2 25	2 75	2 50						19 44		
8069	Hadley, Harris & Co., Wilson, N. C.	Hadley's Boss Guano	Wilson	8 36	78	1 56	2 34	2 84	2 89						20 53		
Brand claiming				8 00			2 26	2 75	3 00						20 03		
9103	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Favorite Cotton Grower	Fremont	8 42	.52	1 80	2 32	2 82	2 91						20 52		
Brand claiming				8 00			2 88	3 50	5 00						24 80		
9804	Farmers Cotton Oil Co., Wilson, N. C.	Royal Tobacco Guano.	Selma	7 39	1 74	1 81	3 58	4 35	5 02			4 70			27 13		
Brands claiming				8 00			2 47	3 00	2 00						19 77		
9625	Armour Fertilizer Works, Wilmington, N. C.	Armour's Cotton Grower	Lawdale	7 96	1 08	1 44	2 52	3 03	2 37						20 35		
8846	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh Pacific Tobacco and Cotton Grower.	LaGrange	8 99	1 08	1 36	2 44	2 97	2 32			2 32		5 45	20 89		

9012	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton-seed Meal Special	Wallace	7 40	1 04	1 50	2 54	3 09	3 40	21 07
8930	N. C. Cotton Oil Co., Wilmington, N. C.	Pate's Special	Wilmington	8 41	1 06	1 40	2 46	2 99	2 14	20 25
8802	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s L. and M. Special	Raleigh	9 52	1 80	74	2 54	3 09	2 84	22 36
Brands claiming				8 00			2 47	3 00	2 50	20 32
8880	Acme Fertilizer Co., Wilmington, N. C.	Acme Fertilizer	Williamston	7 88	1 20	1 24	2 44	2 97	2 72	20 33
9261	Conestee Chemical Co., Wilmington, N. C.	Conestee Fertilizer	Red Springs	8 70	76	1 56	2 32	2 82	2 63	20 47
9808	Va.-Car. Chemical Co., Richmond, Va.	Admiral C. S. M.	Selma	8 45	1 20	1 60	2 83	3 44	1 93	21 82
9094	do	Atlas Guano	Greenville	7 90	1 16	1 38	2 54	3 09	3 43	21 55
9224	do	Split Silk C. S. M.	Kenly	8 15	2 10	1 54	3 64	4 43	1 61	24 39
8940	do	Good Luck	Roseboro	8 06	98	1 54	2 52	3 06	2 52	20 61
9058	do	So. Chem. Co.'s George Washington Plant Bed Fert. for Tob.	Durham	8 45	1 82	76	2 58	3 14	2 41	21 09
Brands claiming				8 00			2 47	3 00	3 00	20 89
9330	Acme Mfg. Co., Wilmington, N. C.	Best's Fish Scrap Guano	Rose Hill	8 00	1 16	1 26	2 42	2 94	3 07	20 74
8911	do	Pee Dee Special Fertilizer	Chadbourn	8 77	1 84	64	2 48	3 02	3 29	21 93
8856	American Agricultural Chemical Co., New York, N. Y.	Lazaretto Special Tobacco and Potato Fertilizer	Edenton	8 61	1 68	86	2 54	3 09	3 28	8 25 22 02
9061	do	Zell's Bright Tobacco Guano	Durham	8 26	1 94	44	2 38	2 89	3 48	9 26 21 26
9289	American Fertilizer Co., Norfolk, Va.	American Eagle Guano	Wadesboro	9 07	1 62	98	2 60	3 16	3 28	22 69
8988	do	do	Shelby	9 92	1 54	60	2 14	2 60	2 53	20 72
4550	do	Ammoniated Eagle Guano	Rockingham	9 00			2 24	2 72	2 41	20 16
9142	do	Miller & Co.'s Yellow Leaf	Dunn	8 08	1 36	62	1 98	2 41	3 94	3 48 19 92
9244	Armour Fertilizer Works, Wilmington, N. C.	Armour's Cotton Special	Roseboro	7 05	94	1 38	2 32	2 82	2 91	19 29
9149	do	Armour's Tobacco Special Fertilizer	Wilmington	7 01	1 34	1 32	2 66	3 23	3 10	15 2 95 12 20 89
9499	do	Armour's Underwood Favorite	Smithfield	6 92	1 04	1 32	2 36	2 87	2 91	19 34
9697	Arps, G. L., & Co., Norfolk, Va.	Arps' Quick Growth for All Crops	Colrain	8 44	1 94	70	2 64	3 21	2 52	21 46
9673	Ashpoo Fertilizer Co., Charleston, S. C.	High Grade Golden Tobacco Product	Lexington	8 79	1 62	84	2 46	2 99	2 96	17 2 79 12 21 50

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100										Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.														
Brands claiming														
9424	Atlantic Chemical Co., Norfolk, Va.	Atlantic High Grade Cotton Guano.	Kings Mountain	8.00			2.47	3.00	3.00					\$20.89
9577	Bailey, John L. & Co., Elm City, N. C.	Fairmount Guano.	Westrys	8.06	1.78	.86	2.64	3.21	2.95					21.59
8831	Baugh & Sons Co., Norfolk, Va.	Baugh's Grand Rapid High Grade Truck Guano.	Wadesboro.	9.38	1.66	.86	2.52	3.06	2.99					22.31
9426	Berkley Chemical Co., Norfolk, Va.	Advance Crop Grower.	Kings Mountain	8.22	1.76	.84	2.60	3.16	3.42					22.08
9665	do.	Berkley's Tobacco Guano.	Richlands	7.80	1.88	.78	2.66	3.23	3.08					21.58
9797	Bertie Cotton Oil Co., Aulander, N. C.	Bertie's Ideal Cotton Grower	Greenville	8.07	2.04	.86	2.90	3.53	3.28	3.28		7.90	23.05	
9021	Bragaw Fertilizer Co., Washington, N. C.	Beaufort County Guano	Washington	7.56	.82	1.50	3.32	4.04	2.97				21.01	
9554	Bradley Fertilizer Co., Boston, Mass.	High Grade Guano	Charlotte	7.53	.92	1.68	2.60	3.16	3.04				21.04	
9708	Brawley, E. W., Mooresville, N. C.	Leo.	Mooresville	8.00	1.62	.86	2.48	3.02	3.27				21.24	
8929	Bryant Fertilizer Co., Alexandria, Va.	Bryant's High Grade Fertilizer	Lumberton	7.70	.96	1.72	2.68	3.26	3.35				21.87	
9699	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Best	Jonesboro	8.17	.50	2.06	2.56	3.11	3.11				21.52	
9057	do.	Tobacco Queen	Robertsonville	8.13	1.94	.62	2.56	3.11	3.35				21.97	
9598	Camp, W. H., Petersburg, Va.	Lion and Monkey Brand Fertilizer—Special for Tobacco.	Roxboro	8.22	1.62	.88	2.50	3.04	3.31	3.31		7.21	21.51	
9513	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eclipse Ammoniated Guano.	Garner	8.94	.78	1.40	2.18	2.65	3.25	3.25		6.55	20.78	
9247	do.	Horne's Best	Roseboro.	8.25	1.58	1.08	2.66	3.23	3.07				21.97	
9451	Chesapeake Chemical Co., Baltimore Md.	S. C. Co.'s Fish Guano.	Windsor	8.20	.82	1.50	2.32	2.82	3.16				20.60	
				8.94	1.12	.80	1.92	2.33	2.88				19.28	

9196	Clayton Oil Mill, Clayton, N. C.	Clayton Guano	Clayton	8 77	.50	1.62	2.12	2.58	3.03	.....	20 13
9197	do	Clayton Special Tobacco Grower	Clayton	8 74	1 18	1.44	2.62	3.19	2 51	.08 2 43	06 21 63
8831	Columbia Guano Co., Norfolk, Va.	Hycro Tobacco Guano	Kinston	8 10	1 68	.88	2 56	3 11	3 15	.....	6 88 21 51
9037	do	Olympia Cotton Guano	Ayden	9 56	.88	1 36	2 24	2 72	3 32	.....	21 66
9500	Conestee Chemical Co., Wilmington, N. C.	Conestee Fish Scrap Guano	Four Oaks	7 84	1 34	1 00	2 34	2 84	3 55	.....	20 79
8957	do	Conestee Special Fertilizer	Lumberton	7 80	1 40	1 00	2 40	2 92	3 41	.....	20 85
9221	Contentnea Guano Co., Wilson, N. C.	Top Notch Fertilizer	Kenly	8 04	1 54	1 16	2 70	3 28	3 60	.....	22 54
8924	Cooper Guano Co., Wilmington, N. C.	Cooper's Lenox	Wilmington	8 34	1 88	.68	2 56	3 11	3 33	.....	21 92
9612	do	Cooper's Sunset	Mount Tabor	8 62	1 88	1 28	2 16	2 63	4 89	.....	22 21
9803	Craven Chemical Co., New Bern, N. C.	C. E. Foy High Grade Guano	Selma	7 70	.82	1 48	2 30	2 80	3 56	.....	20 51
9853	do	Duplin Tobacco Grower	Deep Run	8 22	1 80	.86	2 66	3 23	3 32	13 3 19	10 2 22
9292	Crow Fertilizer Co., Monroe, N. C.	Crow's High Grade Blood and Fish Guano	Monroe	8 17	1 50	1 06	2 56	3 11	3 87	.....	23 99
9314	Eastern Cotton Oil Co., Hertford, N. C.	Rain-proof Cotton Grower	Edenton	8 23	1 06	1 40	2 46	2 99	3 80	.....	21 96
9766	Etiwan Fertilizer Co., Charleston, S. C.	Etiwan Cotton Compound	Rowland	8 61	2 08	.92	3 00	3 65	3 06	.....	23 71
8819	Farmers Cotton Oil Co., Wilson, N. C.	Golden Gem Guano	Selma	8 29	1 00	1 56	2 56	3 11	3 72	.....	22 30
8883	do	Golden Grade Guano	Kinston	7 20	1 16	1 30	2 46	2 99	4 53	.....	21 79
9331	do	Graves' Cotton Grower	Clinton	7 15	1 46	1 34	2 80	3 40	4 01	.....	22 60
9501	do	Money Point Guano	Four Oaks	7 95	1 18	1 18	2 36	2 87	3 43	.....	20 84
9798	Farmville Cotton Oil and Fertilizer Co., Farmville, N. C.	Golden Crown	Greenville	8 12	1 38	1 30	2 68	3 26	4 02	.....	22 99
8822	Floradora Guano Co., Laurinburg, N. C.	Oseola	Fayetteville	8 87	.96	1 44	2 40	2 92	3 89	.....	22 34
9113	Fremont Oil Mill Co., Fremont, N. C.	Fremont Standard Fertilizer	Fremont	8 56	1 12	1 28	2 40	2 92	3 28	.....	21 39
9442	do	do	Fremont	8 58	.96	1 26	2 22	2 70	3 48	.....	20 87
9623	Georgia Chemical Works, Augusta, Ga.	Intensive Formula	Lawndale	8 52	2 22	.72	2 94	3 57	3 41	.....	23 77
9022	Hampton Guano Co., Norfolk, Va.	Hampton Tobacco Guano	Washington	8 78	1 82	.64	2 46	2 99	3 13	6 88	21 68
8943	do	Princess Prolific Producer	Clinton	8 22	1 86	.66	2 52	3 06	3 46	.....	21 79
8808	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard Yellow Wrapper Guano	New Bern	7 72	1 36	1 18	2 54	3 09	3 32	6 80	21 27

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.														
Brands claiming														
9865	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard Yellow Wrapper Guano.	Townsville	8.03	1.34	1.10	2.44	2.97	3.28	3.28				21.18
8946	Imperial Co., Norfolk, Va.	Imperial Tobacco Guano	Greenville	8.10	1.90	.78	2.68	3.26	3.47	3.47				22.36
9876	do.	do.	Senora	8.10	1.84	.76	2.60	3.16	2.96	2.96				21.47
9051	do.	X. L. O.	Tarboro	8.57	1.78	.80	2.58	3.11	3.37					21.81
9805	Interstate Chemical Corporation, Charleston, S. C.	Honest Queen High Grade Guano.	Rockingham	8.16	1.27	1.20	2.44	2.97	3.62					21.57
8832	do.	do.	Rockingham	8.17	1.22	1.26	2.48	3.02	3.16					21.24
9813	Josey, N. B., Guano Co., Tarboro, N. C.	Josey's Cotton-seed Meal and Fish Scrap Guano.	Wake Forest	8.80	1.05	1.46	2.52	3.05	3.41					22.25
9498	do.	Josey's Tip Top Cotton-seed Meal and Fish Scrap.	Benson	8.90	.92	1.46	2.38	2.89	3.65					22.03
9510	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	Cottonaid	Tar Heel	9.52	.48	1.76	2.24	2.72	3.60					21.94
8891	do.	Silver Dollar	Lumberton	8.25	1.20	1.64	2.81	3.45	3.85					23.59
9176	MacMurphy Co., Charleston, S. C.	Special Cotton and Corn Guano	Cerro Gordo	8.53	.94	1.92	2.86	3.48	3.33					23.35
9792	do.	Special S-3-3 Guano	Wadesboro	8.65	1.22	1.68	2.90	3.53	3.22					23.51
8812	Martin, D. B., Co., Richmond, Va.	Martin's Bull Head Fertilizer for Cotton and Tobacco.	New Bern	8.25	1.46	.76	2.22	2.70	3.00	3.00			7.15	20.05
9223	Martin & White, Baltimore, Md.	Martin & White's Horseshoe Brand.	Kenly	8.77	1.86	.44	2.30	2.80	2.99					20.74
8815	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Gold Leaf Tobacco Guano.	New Bern	8.60	1.42	1.32	2.74	3.33	3.25	3.25			7.20	22.82
9840	do.	do.	Fort Barwell	7.94	1.36	1.20	2.56	3.11	3.33	3.33			6.10	21.56

9839	do.	do	Fort Barnwell	8 05	1 38	1 14	2 52	3 06	3 38	3 38	6 32	21 55
9401	Miller Fertilizer Co., Baltimore, Md.	Standard Phosphate	Marshallville	8 12	1 70	.92	2 62	3 19	3 38			22 30
9101	do.	Tobacco King	Fremont	8 09	1 66	.82	2 48	3 02	3 51	3 51	7 58	21 56
8885	Navassa Guano Co., Wilmington, N. C.	Clarendon Tobacco Guano	Lamberton	6 91	.86	2 26	3 12	3 79	3 73	3 73	5 72	23 42
8834	do.	Navassa High Grade Guano	Rockingham	8 43	1 52	1 24	2 76	3 36	3 75			23 30
9827	do.	do	Fayetteville	8 41	1 18	1 10	2 28	2 77	2 92			20 36
9102	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Foy's High Grade Fertilizer	Fremont	9 44	.70	1 62	2 32	2 82	2 95			21 45
9630	do.	Le noir Bright Leaf Tobacco Grower.	Kinston	8 64	1 00	1 64	2 64	3 21	3 52	.13	3 39	22 74
9036	do.	Pitt's Profitic Golden Tobacco Grower.	Axden	9 06	.98	1 78	2 76	3 36	3 14	13	3 01	10 29 20
9166	N. C. Cotton Oil Co., Charlotte, N. C.	Dixie Standard Fertilizer	Lincolnton	8 03	1 08	1 36	2 44	2 97	3 04			20 82
4641	N. C. Cotton Oil Co., Wilmington, N. C.	Carter's Lifter	Fayetteville	8 19			2 46	2 99	3 40			21 44
9727	do	Clute's Cotton Grower	Clinton	8 06	1 08	1 26	2 34	2 84	3 46			20 89
9768	do	Lewis' Special	Mount Tabor	8 69	1 04	1 26	2 30	2 80	3 58			21 42
4476	do	Wilmington High Grade	Lumber Bridge	10 27			2 50	3 04	3 36			23 44
8927	do	do.	Wilmington	8 24	.88	1 60	2 48	3 02	3 53			21 71
9216	Norfolk Fertilizer Co., Norfolk, Va.	Oriana for Cotton	Mount Gilead	8 52	1 70	.66	2 36	2 87	3 36			21 28
9339	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special Compound for Tobacco,	Oxford	8 25	1 74	.82	2 56	3 11	3 51	3 27	24	2 46 22 04
8884	do.	do	Kinston	8 59	2 00	.76	2 76	3 36	2 92	2 81	11	2 11 22 53
8848	Pamlico Chemical Co., Washington, N. C.	Success Guano	Bayboro	8 55	1 08	1 76	2 84	3 45	3 86			23 87
8903	do.	Tobacco Growers' Friend	Washington	9 87	1 08	1 42	2 50	3 04	3 83	11	3 72	08 23 59
4469	do	do.	Old Sparta	8 25			2 78	3 38	3 46	.85	2 61	64 22 90
9217	Patapsco Guano Co., Baltimore, Md.	Choctaw Guano	Sanford	8 16	1 56	.88	2 44	2 97	2 42			20 25
4624	do	do.	Lucama	7 92			2 48	3 02	3 12			20 08
8897	Pearsall & Co., Wilmington, N. C.	Pearsall's High Grade Use Me Guano,	Lamberton	7 86	1 02	1 48	2 50	3 04	4 38			22 39
4552	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' Soluble Guano	Rockingham	8 49			2 42	2 94	3 26			21 39
9681	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Levering's Reliable Tobacco Guano.	Burlington	9 50	1 70	40	2 10	2 55	3 37	3 87	10 10	21 08

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.			
MIXED FERTILIZERS.															
Brands claiming															
88571	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont High Grade Ammoniated Bone and Potash.	Wadesboro	8 07	1 40	1 16	2 56	3 11	3 45						\$20 89
9295	do.	do.	Wadesboro	7 82	1 42	1 10	2 52	3 06	3 69						21 68
9115	Pine Level Oil Mill Co., Pine Level, N. C.	Pine Level High Grade Fertilizer.	Pine Level	8 41	.78	1 40	2 18	2 65	3 48						20 55
9182	Peachontas Guano Co., Lynchburg, Va.	Farmers' Favorite, Apex Brand Youngsville.	Apex	8 07	1 42	1 02	2 44	2 97	2 93						20 73
8965	Pocomoke Guano Co., Norfolk, Va.	Harvey's High Grade Monarch.	Edenton	8 57	1 94	.70	2 64	3 21	3 09						22 20
9119	do.	do.	Avoca	8 25	1 90	.72	2 62	3 19	3 24						21 99
8850	do.	Monarch Tobacco Grower.	LaGrange	8 31	1 86	.88	2 74	3 33	3 25	3 25		8 16	22 56		
8852	Powhatan Chemical Co., Richmond, Va.	P. C. Co.'s Hustler.	LaGrange	8 19	1 40	1 12	2 52	3 06	3 32				21 62		
9218	Rasin-Monumental Co., Baltimore, Md.	Rasin's Gold Standard C. S. M.	Roseboro	7 68	1 08	1 40	2 48	3 02	3 09				20 73		
9886	do.	Rasin's Indian Brand for Tobacco.	Mount Airy	7 75	2 10	.92	3 02	3 67	3 91				23 96		
9355	Reed Phosphate Co., Charleston, S. C.	Reed's High Grade Cotton Grower.	Wadesboro	9 18	.90	1 14	2 04	2 48	2 96				20 09		
9633	Reidsville Fertilizer Co., Reidsville, N. C.	Royal Fertilizer.	Reidsville	8 37	.61	1 52	2 16	2 63	3 16				20 08		
8836	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer.	Rockingham	8 02	1 52	1 06	2 58	3 14	3 19				21 56		
9279	Robertson Fertilizer Co., Norfolk, Va.	Big Crop High Grade Guano.	Parkton	7 57	1 56	1 01	2 60	3 16	3 19				21 24		
9609	do.	Robertson's Special Formula for Tobacco.	Fairmont	8 95	1 50	.82	2 32	2 82	2 69	2 69		5 45	20 78		

9169	Rowan Chemical Co., Salisbury, N. C.	Rowan Double Header Guano.	Norwood	8.04	1.70	.82	2.52	3.06	3.02	-----	21 14
8889	Royster, F. S., Guano Co., Norfolk, Va.	Bonanza Tobacco Guano	Kinston	8.10	1.62	.82	2.44	2.97	3.11	3.11	6.38 20 96
9350	-----do-----	Marlboro High Grade Cotton Grower.	Rockingham	8.27	1.66	.82	2.48	3.02	3.05	-----	21 21
9374	-----do-----	-----do-----	Statesville	8.06	1.76	.66	2.42	2.91	3.25	-----	20 99
9657	-----do-----	Royster's Special Sweet Potato Guano.	Harbinger	8.07	1.70	.82	2.52	3.06	2.88	-----	21 01
8854	Scotland Neck Guano Co., Scotland Neck, N. C.	Josey's Tip Top Tobacco Guano	LaGrange	8.74	1.02	1.40	2.42	2.94	3.69	3.69	10 50 22 09
9740	Shannonhouse, H. T., Hertford, N. C.	Southern Pride Guano.	Hertford	8.15	1.60	.98	2.58	3.11	2.78	-----	21 23
9387	Southern Chemical Co., Roanoke, Va.	Pride of Virginia	Stoneville	8.35	1.54	.98	2.62	3.06	3.23	-----	21 65
9358	Southern Cotton Oil Co., Charlotte, N. C.	Peacock High Grade Fertilizer	Morven	8.99	.92	1.36	2.23	2.77	3.13	-----	21 11
9421	Southern Cotton Oil Co., Davidson, N. C.	Moon High Grade Fertilizer	Belmont	8.87	.92	1.62	2.54	3.09	3.59	-----	22 60
9547	-----do-----	Peacock High Grade Fertilizer	Canton	9.03	1.78	.62	2.40	2.92	3.09	-----	21 60
9393	Southern Cotton Oil Co., Fayetteville, N. C.	Fayetteville Oil Mill Special Cotton Grower.	Fayetteville	9.01	.62	1.68	2.30	2.80	3.04	-----	21 11
9770	-----do-----	-----do-----	Parkton	8.85	.68	1.56	2.24	2.72	3.11	-----	21 19
4657	-----do-----	-----do-----	Fayetteville	9.04	-----	2.24	2.72	3.28	-----	-----	21 15
9033	Southern Cotton Oil Co., Goldsboro, N. C.	Edgerton's Old Reliable	Grifton	8.63	.58	1.92	2.50	3.04	3.71	-----	22 35
9495	-----do-----	-----do-----	Smithfield	8.88	.58	1.80	2.38	2.89	2.87	-----	21 14
9733	-----do-----	Morning Glory	Wendell	7.17	.60	1.68	2.28	2.77	3.06	-----	19 39
9886	-----do-----	Peacock High Grade Fertilizer	Manson	8.76	1.04	1.46	2.50	3.04	3.50	-----	22 23
9539	-----do-----	-----do-----	Rowland	8.62	1.56	1.14	2.70	3.28	2.47	-----	21 81
9619	Southern Cotton Oil Co., Shelby, N. C.	-----do-----	Lawndale	8.55	1.06	1.36	2.42	2.94	3.09	-----	21 26
8933	Southern Exchange Co., Maxton, N. C.	Comet Cotton Compound	Wilmington	8.14	1.96	.64	2.60	3.16	3.46	-----	22 05
8971	-----do-----	Jack's Best Fertilizer	Maxton	8.08	1.90	.70	2.60	3.16	3.49	-----	22 03
4640	-----do-----	-----do-----	Fayetteville	8.22	-----	2.54	3.09	3.15	-----	-----	21 53
9785	Statesville Oil and Fertilizer Co., States- ville, N. C.	8-3-3 Soluble Guano	Statesville	8.41	.24	2.30	2.54	3.09	3.29	-----	23 85
9635	Swift Fertilizer Works, Atlanta, Ga.	Swift's Carolina Tobacco Grower—High Grade.	Kinston	8.57	1.28	1.30	2.58	3.14	2.73	43 2 20	32 21 55
4633	-----do-----	-----do-----	Lacama	8.58	-----	2.26	2.75	2.98	-----	42 2 56	32 20 30

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Nitrate.	Potash from Sulphate.	Chlorine.			
MIXED FERTILIZERS.															
Brands claiming															
9009	Swift Fertilizer Works, Atlanta, Ga.	Swift's Ruralist High Grade	Burgaw	8.00			2.47	3.00	3.00						\$20.89
9755	Tidewater Guano Co., Norfolk, Va.	Sho Nuf Guano High Grade Complete Manure.	Battleboro	9.03	1.59	.87	2.46	2.99	3.25						22.03
9258	Tuscarora Fertilizer Works, Wilmington, N. C.	Tuscarora Cotton Special	Wilmington	7.90	1.38	1.16	2.54	3.09	2.90						20.97
9867	do.	S. C. Tobacco Special	Hester	7.73	1.10	1.28	2.38	2.89	2.90						20.14
9496	do.	Tuscarora Tobacco Special	Smithfield	7.64	1.10	1.12	2.22	2.70	3.26	.07	3.19	.05	19.79		
9297	Union Guano Co., Winston, N. C.	Union Homestead Guano.	Wadesboro	7.80	1.54	1.36	2.90	3.53	2.42	13	2.20	.10	21.86		
8872	do.	do.	Wadesboro	8.38	.52	1.84	2.36	2.87	3.19				20.96		
9889	do.	Victoria High Grade Tobacco Guano.	Stoneville	9.57	1.34	1.04	2.38	2.89	3.21				22.14		
9821	United States Guano Co., Baltimore, Md.	Farm Bell Tobacco Special	Winterville	9.40	1.46	.68	2.14	2.60	3.01	.13	2.88	.10	20.76		
9116	do.	do.	Dunn	8.01	1.70	1.22	2.92	3.55	3.67	3.67		10.37	23.51		
9384	Upshur, R. L., Guano Co., Norfolk, Va.	Upshur's Cotton Guano	Edenton	7.62	.88	1.64	2.52	3.06	3.19	3.19		9.28	20.95		
9876	Vance Guano Co., Henderson, N. C.	Fish Brand Tobacco Manure	Henderson	8.17	1.26	1.32	2.58	3.14	2.83				21.30		
4586	do.	do.	Townsville	8.63	1.02	1.40	2.42	2.94	4.29	13	4.16	10	22.65		
9757	Venable Fertilizer Co., Richmond, Va.	Ballard's Choice Fertilizer	Elm City	8.56			2.56	3.11	2.93	58	2.35	.44	21.68		
9890	do.	Venable's High Grade Tobacco Fertilizer.	Mount Airy	7.30	1.20	1.30	2.50	3.04	3.46				20.88		
				7.94	1.18	1.32	2.50	3.04	3.24	3.24		4.30	21.21		

9043	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Guano.	Faison.	8.71	1.72	84	2.56	3.11	4.51	23.55
8797	do.	Blake's Best	Raleigh	8.29	1.30	1.18	2.48	3.02	3.35	21.56
9473	do.	Groom's Special Cotton Fert.— Fish and Meal Mixture.	Burgaw	9.20	84	1.52	2.36	2.57	2.78	21.25
8915	do.	Diamond C. S. M. Guano.	Whiteville	8.14	1.08	1.36	2.44	2.97	3.45	21.37
8839	do.	Durham Fertilizer Co.'s Gold Medal Brand Guano.	Rockingham	10.57	86	1.40	2.26	2.75	3.63	23.00
9325	do.	Lynchburg Guano Co.'s Bright Belt Guano.	Snow Hill	8.30	1.84	.82	2.66	3.23	2.93	21.86
9880	do.	Miller & Co.'s Yellow Leaf Fer- tilizer.	Reidsville	8.19	1.90	.51	2.44	2.97	3.31	13 3 18 10 21 26
4485	do.	Norfolk and Carolina Chemical Co.'s Amazon H. G. Manure.	Dunn	8.69			2.50	3.04	3.09	21.72
9300	do.	do.	Wadesboro	9.38	1.30	.96	2.26	2.75	3.21	21.46
4638	do.	do.	Fayetteville	8.46			2.38	2.89	3.08	21.00
8919	do.	do.	Whiteville	8.75	74	1.30	2.04	2.48	3.24	20.06
9129	do.	Norfolk and Car. Chem. Co.'s Bright Leaf Tobacco Grower.	Trenton	7.87	1.02	1.40	2.42	2.94	3.38	3.38 5.70 20.96
9878	do.	Oldham's Special Compound for Tobacco.	Milton	7.55	1.48	.82	2.30	2.80	3.11	3.11 3.17 19.87
9007	do.	Old Dent Guano Co.'s Farmers' Friend H. G. Fertilizer.	Wallace	8.83	1.78	.66	2.44	2.97	3.42	21.96
9557	do.	Powers, Gibbs & Co.'s Carolina Golden Belt Ammo. Guano.	Spring Hope	8.71	.06	1.70	1.76	2.14	2.60	18.09
8908	do.	Powers, Gibbs & Co.'s Old Ky. High Grade Tobacco Manure.	Washington	7.89	.88	1.80	2.68	3.26	3.01	3.01 5.76 21.47
9374	do.	Royal High Grade Fertilizer.	Lillington	8.39	1.80	.56	2.36	2.87	3.66	21.49
8890	do.	Special High Grade Tobacco Fertilizer.	Kinston	8.26	1.34	1.44	2.78	3.38	2.85	2.71 22.21
9128	do.	Va.-Car. Chem. Co.'s Bright Leaf Tobacco Grower.	Richlands	8.61	2.00	.80	2.80	3.40	3.09	21 2.88 16 29.91
9179	do.	Va. State Fert. Co.'s Bull Dog Guano.	Mount Tabor	8.51	1.64	.76	2.40	2.92	3.39	21.17
9734	do.	Va. State Fert. Co.'s Dunning- ton's Special Formula for Tob.	Wendell	9.14	1.46	.76	2.22	2.70	3.02	3.02 2.85 20.97
9724	Wilson Chemical Co., Wilson, N. C.	Matchless Cotton Grower	Nashville	9.49	.98	1.40	2.38	2.89	3.01	21.85
9207	Winborne-Brown Guano Co., Norfolk, Va.	King Farming Guano.	Waddell	7.97	1.80	.48	2.28	2.77	2.91	19.95
9569	do.	Winborne's Tobacco Guano.	Harrisville	8.09	1.64	.50	2.14	2.60	2.52	8.34 19.14
9324	Young, J. R., Fertilizer Co., Norfolk, Va.	Young's Special Guano for Col- ton.	Winterville	8.37	1.54	.86	2.40	2.92	2.80	20.69

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

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Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.								Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.													
Brands claiming				8 00		2 47	3 00	4 00					\$21 97
9752	Farmers Cotton Oil Co., Wilson, N. C.	Newson's Tobacco Special	Elm City	7 75	1 20	1 44	2 64	3 21	3 88	17	3 71	12	22 31
9431	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Royal Ensign Guano	New Bern	8 21	1 32	1 08	2 40	2 92	3 62				21 45
9562	Meadows, E. H. & J. A., Co., New Bern	Parker's Special Tobacco Guano	Greenville	8 90	1 14	1 36	2 50	3 04	4 09	3 09	1 00	2 32	23 01
9683	Martin, D. B., Co., Richmond, Va.	Privott's Favorite Guano	Edenton	8 08	1 64	.80	2 44	2 97	3 76				21 66
8932	N. C. Cotton Oil Co., Wilmington, N. C.	Bullock's Cotton Grower	Wilmington	8 10	1 14	1 66	2 80	3 40	4 20				23 67
9584	Peachontas Guano Co., Lynchburg, Va.	Indian Special Tobacco Grower	Siler City	8 07	1 60	1 10	2 70	3 28	3 55	3 56		7 07	22 52
9419	Robertson Fertilizer Co., Norfolk, Va.	Robertson's Soluble High Grade Kings Mountain Guano	Kings Mountain	8 05	1 54	1 04	2 58	3 14	2 81				22 78
9537	Southern Exchange Co., Maxton, N. C.	Bull of the Woods Fertilizer	Maxton	8 02	1 92	.56	2 48	3 01	4 17				22 20
9137	do.	do.	Laurinburg	7 98	1 48	1 00	2 48	3 01	4 09				22 10
9066	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fert. Co.'s Green's Special Fertilizer	Warsaw	8 82	1 84	.62	2 46	2 99	4 01				22 68
8955	do.	Farmers' Success	Lumberton	9 05	1 98	.58	2 56	3 11	4 19				23 50
Brands claiming				8 00		2 47	3 00	5 00					23 07
9807	American Agricultural Chemical Co., New York, N. Y.	Excelsior Compound for Tobacco	Selma	8 10	1 74	.86	2 60	3 16	5 46	5 46		7 02	24 22
4183	Navassa Guano Co., Wilmington, N. C.	Navassa Blood and Meal Mixture	Selma	8 17			2 52	3 06	4 46				22 84
4630	do.	do.	Lucama	9 19			2 68	3 26	3 91				23 83

9439	do	do	Lucama	8 05	1 44	.94	2 38	2 89	3 45	21 03
4588	Pamlico Chemical Co., Washington, N. C.	Pamlico High Grade Tobacco Grower.	Washington	8 67			2 76	3 36	5 66	1 09 4 57 .82 25 62
9316	do	do	Washington	9 09	98	1 69	2 58	3 14	5 01	.11 4 93 08 24 36
9103	Patapsco Guano Co., Baltimore, Md.	Patapsco Plant Food.	Fremont	8 70	2 08	.14	2 82	3 43	5 32	25 53
4631	do	do	Lucama	8 09			2 64	3 21	5 31	9 46 24 19
9329	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand Guano for Tobacco.	Kinston	8 33	2 12	.86	2 98	3 62	3 10	10 3 00 .08 23 42
	Brand claiming			8 00			2 47	3 00	6 00	24 17
9742	Miller Fertilizer Co., Baltimore, Md.	Miller's 8-3-6.	Elizabeth City	8 35	1 90	.52	2 42	2 94	5 51	23 74
	Brands claiming			8 00			2 47	3 00	10 00	28 57
8912	Baugh & Sons Co., Norfolk, Va.	Baugh's Fruit and Berry Guano	Chadbourn	8 04	1 52	1 06	2 58	3 14	10 00	29 07
9472	Cooper Guano Co., Wilmington, N. C.	Cooper's Chadbourn Truckee	Burgaw	7 98	1 18	1 36	2 54	3 09	10 41	29 30
	Brand claiming			8 00			3 29	4 00	3 00	24 32
9560	Va.-Car. Chemical Co., Richmond, Va.	Travers & Co.'s Capital Tobacco Fertilizer.	Greenville	8 25	2 64	.64	3 28	3 99	3 12	3 12 2 35 24 63
	Brands claiming			8 00			3 29	4 00	4 00	25 42
9333	Acme Mfg. Co., Wilmington, N. C.	Acme O K Fertilizer.	Rose Hill	7 92	1 86	1 08	2 94	3 57	4 26	24 16
8945	do	Quickstep Fertilizer	Roseboro	7 57	1 60	1 62	3 22	3 91	4 46	26 24
9191	American Agricultural Chemical Co., New York, N. Y.	Lazaretto Manure Substitute.	Gastonia	8 25	2 62	.66	3 28	3 99	3 72	25 29
9211	American Fertilizer Co., Norfolk, Va.	N. C. and S. C. Cotton Grower	Lumberton	7 97	2 14	1 38	3 52	4 28	4 28	26 66
9553	do	do	Morven	9 02	1 93	.98	2 94	3 57	4 38	25 28
9375	do	do	Lillington	7 47	1 82	1 72	3 54	4 30	3 76	25 77
9245	Armour Fertilizer Works, Wilmington, N. C.	Armour's No. 841	Roseboro	7 20	1 18	1 40	2 58	3 14	4 35	22 11
8952	Arps, G. L. & Co., Norfolk, Va.	Arps' Go-a-Head Guano for Truck.	Roper	8 80	2 54	.66	3 20	3 89	3 93	25 71
9717	Asheville Packing Co., Asheville, N. C.	High Grade Fertilizer	Asheville	5 45	.92	2 88	3 80	4 62	3 23	24 42
8213	Baugh & Sons Co., Norfolk, Va.	Baugh's Fish, Bone and Potash	Chadbourn	8 59	2 08	1 24	3 32	4 01	4 10	26 18
9577	do	do	Aberdeen	8 15	2 40	.80	3 20	3 89	4 40	27 41
9555	Bartie Cotton Oil Co., Anlander, N. C.	Bartie's Meat Mixture	Greenville	7 45	1 03	2 38	3 11	4 18	4 28	25 85

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.			
MIXED FERTILIZERS.															
	Brands claiming			8 00			3 29	4 00	4 00					\$25 42	
9263	Berkley Chemical Co., Norfolk, Va.	Victory Special Crop Grower	Waxhaw	8 44	2 20	1 00	3 20	3 89	4 16					25 61	
8958	Bryant Fertilizer Co., Alexandria, Va.	Bryant's High Grade Guano	Lumberton	8 42	1 24	2 14	3 38	4 11	4 04					25 95	
9056	Burton, C. J., Guano Co., Baltimore, Md.	Burton's High Grade Tobacco Grower.	Robersonville	8 22	2 56	90	3 46	4 21	3 99	3 99			7 14	26 32	
9700	do	J. W. C. Special	Jonesboro	7 99	2 34	1 00	3 34	4 06	3 96					25 57	
9790	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Special 8-4-4	Hamlet	8 58	2 62	62	3 24	3 94	4 27					26 03	
9413	Columbia Guano Co., Norfolk, Va.	Columbia Special Truck Guano	Greensboro	8 90	2 18	.88	3 06	3 72	4 59					25 91	
9435	do	Trojan Tobacco Guano	Kinston	7 97	2 36	.92	3 28	3 99	4 22	4 22			7 78	25 59	
9578	Contentnea Guano Co., Wilson, N. C.	Climax High Grade Guano for All Crops.	Nashville	8 97	1 36	2 18	3 54	4 30	4 16					27 52	
9121	Craven Chemical Co., New Bern, N. C.	Hanover Standard Guano	Richlands	8 69	2 60	.88	3 48	4 23	3 60					26 40	
9852	do	do	Fort Barnwell	8 49	2 16	.90	3 06	3 72	3 59					24 44	
9654	Eastern Cotton Oil Co., Hertford, N. C.	Mat White's Special	Edenton	8 09	1 62	1 74	3 36	4 09	4 88					26 76	
9260	Elba Mfg. Co., Maxton, N. C.	Elba High Grade Fertilizer	Maxton	8 84	1 80	1 46	3 26	3 96	4 57					26 67	
9348	Eliwan Fertilizer Co., Charleston, S. C.	Eliwan Special Cotton Fertilizer.	Gibson	8 33	2 16	1 36	3 52	4 28	3 47					26 10	
8979	Farmers Guano Co., Raleigh, N. C.	Farmers' Blood and Bone	Everetts	8 74	1 90	.78	2 68	3 23	4 63					24 21	
8973	Floradora Guano Co., Laurinburg, N. C.	Floradora	Hope Mills.	8 82	1 84	1 48	3 32	4 04	4 92			*		27 29	
9213	do	Florine	Radford	8 33	.56	2 66	3 22	3 91	4 21					25 65	

8811	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Noxall	New Bern	8 03	2 00	.98	2 98	3 62	3 50	23 59
9053	Imperial Guano Co., Norfolk, Va.	Snowflake Cotton Grower	Tarboro	8 82	2 32	1 04	3 36	4 09	4 03	26 48
9497	Josey, N. B., Guano Co., Tarboro, N. C.	Josey's Cotton-seed Meal and Fish Scrap Tobacco Guano, Gold Dollar	Benson	9 19	1 36	1 74	3 10	3 77	4 23	25 94
8892	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	Special Cotton Guano	Lumberton	8 39	1 06	1 84	2 90	3 53	4 66	24 85
9175	MacMurphy Co., Charleston, S. C.	Special Cotton Guano	Cerro Gordo	9 40	1 84	1 62	3 46	4 21	4 34	27 77
9280	Martin, D. B., Co., Richmond, Va.	Blood and Bone Fertilizer	Elizabeth City	8 18	2 03	.48	3 11	3 78	4 26	25 11
8814	do.	Martin's Red Star Fertilizer	New Bern	8 17	3 26	.22	3 48	4 23	4 97	27 43
9046	do.	do.	Goldsboro	9 04	2 70	.24	2 94	3 57	3 92	24 80
9433	Martin & White Co., New Bern, N. C.	Substitute	Kinston	8 48	2 78	.24	3 02	3 67	4 16	24 89
9854	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Ideal Tobacco Guano	Fort Barnwell	7 95	2 58	1 10	3 68	4 47	4 41	27 49
8816	do.	do.	Vanceboro	8 01	2 14	1 08	3 14	3 82	5 38	26 31
9349	Miller Fertilizer Co., Baltimore, Md.	Everett's Special Cotton Grower	Rockingham	8 30	2 26	1 20	3 46	4 21	4 45	26 90
8896	Navassa Guano Co., Wilmington, N. C.	Navassa Special Truck Guano	Lumberton	8 25	1 30	1 94	3 24	3 94	3 94	25 37
8833	do.	do.	Rockingham	9 38	1 54	1 36	2 90	3 53	3 12	24 05
9603	N. C. Cotton Oil Co., Henderson, N. C.	Two in One for Cotton	Coats	7 93	1 25	2 00	3 25	3 95	3 92	25 10
8931	N. C. Cotton Oil Co., Wilmington, N. C.	Bullock's High Grade Guano	Wilmington	8 13	1 60	1 62	3 22	3 91	4 85	26 17
4477	do.	Wilmington Truck Grower	Lumber Bridge	7 98			3 65	4 44	4 14	27 07
8950	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Ortolo Tobacco Grower	Plymouth	8 89	.82	2 34	3 16	3 84	5 15	26 94
4680	do.	do.	Fort Barnwell	8 84	.72	2 14	2 85	3 45	4 01	24 41
8885	Ober, G., & Sons Co., Baltimore, Md.	Ober's High Grade Fertilizer	Kinston	8 17	2 24	1 06	3 30	4 01	4 92	26 62
9399	Pamlico Chemical Co., Washington, N. C.	Bull's Eye Tobacco Grower	Winterville	8 92	1 80	1 70	3 50	4 26	4 29	27 15
9104	Patapsco Guano Co., Baltimore, Md.	Patapsco Cotton and Tobacco Special	Fremont	8 66	2 30	.98	3 28	3 99	4 01	25 98
9011	Pearsall & Co., Wilmington, N. C.	Pearsall's Bone Meal and Fish for Tobacco and Cotton	Wallace	6 19	1 06	2 00	3 06	3 72	4 22	22 96
9367	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Unexcelled Guano	Sunbury	7 97	2 12	1 04	3 16	3 81	4 90	25 83
9355	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' Special Cotton Fertilizer	Wadesboro	7 33	1 88	1 42	3 30	4 01	4 27	25 15
9123	Pocomoke Guano Co., Norfolk, Va.	Faultless Ammoniated Superphosphate	Dover	8 47	2 51	.90	3 44	4 18	4 23	26 72

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.								Chlorine.	Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		
MIXED FERTILIZERS.													
Brands claiming													
8886	Powhatan Chemical Co., Richmond, Va.	North State Special	Kinston	8 00			3 29	4 03	4 00				\$25 42
9135	Richmond Guano Co., Richmond, Va.	Perfection Special	Concord	8 17	2 24	1 06	3 30	4 01	4 92				26 62
9531	Robertson Fertilizer Co., Norfolk, Va.	Wood's Winner High Grade Guano.	Fairfield	7 75	1 96	1 34	3 30	4 01	4 03				25 27
9538	Royster, F. S., Guano Co., Norfolk, Va.	Jupiter High Grade Guano	Rowland	8 05	1 72	1 36	3 08	3 74	4 03				24 61
8888	do.	Milo Tobacco Guano	Kinston	8 07	2 72	.54	3 26	3 96	4 11				25 47
9076	do.	Truckers' Delight	Gold-sboro	8 27	2 26	.78	3 04	3 70	4 16	1 16	8 04		24 77
9621	Southern Cotton Oil Co., Charlotte, N. C.	Conqueror High Grade Fertilizer.	Ellenboro	9 16	2 70	.70	3 40	4 13	4 41				27 37
9582	Southern Cotton Oil Co., Gibson, N. C.	do.	Lumberton	8 55	1 52	1 44	2 96	3 60	4 01				24 54
9069	Southern Cotton Oil Co., Goldsboro, N. C.	So. Cotton Oil Co.'s Special Mixture.	Wallace	8 77	1 48	1 36	2 84	3 45	4 42				24 68
9051	Southern Cotton Oil Co., Rocky Mount, N. C.	do.	Tarboro	9 22	1 08	1 76	2 84	3 45	3 93				24 55
8970	Southern Exchange Co., Maxton, N. C.	Two Fours Guano	Maxton	8 36	1 18	1 52	2 70	3 28	6 27				25 76
	do.	do.	Lumberton	8 22	1 12	1 24	3 36	4 09	4 36				26 31
9381	do.	do.	Lumberton	7 97	2 62	.64	3 26	3 96	3 99				25 25
8837	Swift Fertilizer Works, Atlanta, Ga.	Swift's Monarch High Grade Guano.	Rockingham	8 64	1 38	1 88	3 26	3 96	3 73				25 57
9257	Tuscarora Fertilizer Co., Wilmington, N. C.	Tuscarora	Red Springs	8 75	1 74	1 30	3 04	3 70	3 91				24 94
9032	United States Fertilizer Co., Baltimore, Md.	Farm Bell Majestic Guano.	Grifton	7 23	1 52	2 00	3 52	4 28	4 29				26 01
9691	do.	do.	Edenton	7 41	2 00	1 30	3 30	4 01	4 52				25 50

9820	do.	do.	Winterville	8 24	1 95	1 20	3 18	3 87	4 35	24 59
8917	Va.-Car. Chemical Co., Richmond, Va.	Carr's S-4-4 Crop Grower	Whiteville	8 92	1 10	1 90	3 00	3 65	4 40	25 57
9470	do.	Croom's Crop Grower	Burgaw	8 18	1 52	1 58	3 10	3 77	3 82	24 58
9471	do.	Croom's Fish and Meal Mixture	Magnolia	8 67	1 76	1 42	3 18	3 87	2 89	24 34
9294	do.	Powers, Gibbs & Co.'s Cotton Brand Ammo. Dis. Bone.	Waxhaw	8 07	2 88	1 4	3 32	4 04	4 53	26 19
9107	do.	V.-C. C. Co.'s Farmers' Choice	Fremont	8 23	1 12	1 94	3 06	3 72	4 40	25 10
9556	do.	V.-C. C. Co.'s Fish and Meal Mixture	Spring Hope	8 45	.02	2 98	3 00	3 65	4 25	24 88
9373	do.	V.-C. C. Co.'s Special	Lillington	8 00	.32	2 18	3 50	4 26	4 62	26 98
9856	do.	do.	Dover	8 12	2 89	.72	3 52	4 28	4 00	26 49
9074	Union Guano Co., Winston, N. C.	Union Premium Guano	Faison	10 03	.95	2 04	3 02	3 67	5 25	27 45
4484	Wilson Chemical Co., Wilson, N. C.	Special Formula Fertilizer	Mount Olive	9 15			3 18	3 87	4 30	26 32
9204	Winborne-Brown Guano Co., Norfolk, Va.	Big Triumph Guano	Waddell	8 93	2 78	.36	3 14	3 82	4 54	26 22
9323	Young, J. R., Fertilizer Co., Norfolk, Va.	Young's 4-8-4 Crop Grower	Winterville	7 91	1 74	1 10	2 84	3 15	3 60	23 01
Brands claiming										
9661	American Fertilizer Co., Norfolk, Va.	Peruvian Mixture, Especially Prepared for Sweet Potatoes.	Poplar Branch	8 76	2 45	70	3 18	3 87	4 91	26 64
9551	Va.-Car. Chemical Co., Richmond, Va.	Powers, Gibbs & Co.'s Truck Special Ammoniated Guano.	Charlotte	8 45	2 66	64	3 30	4 01	5 30	27 29
9574	Wilson Chemical Co., Wilson, N. C.	Special Formula Fertilizer	Nashville	8 63	2 10	1 24	3 34	4 06	5 48	27 82
Brands claiming										
9134	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Rhankatte Special Tobacco Guano	Hanbel	8 48	1 94	1 28	3 22	3 91	5 15	26 82
9660	Eastern Cotton Oil Co., Hertford, N. C.	Currituck's Special for Yellow Sweets.	Powell's Point	7 23	1 88	1 42	3 30	4 01	6 12	27 10
9544	Southern Cotton Oil Co., Davidson, N. C.	Canto Guano	Canton	8 24	.10	3 10	3 20	3 89	7 95	29 60
9545	do.	do.	Canton	8 57	2 22	1 00	3 22	3 91	5 55	27 14
9332	Union Guano Co., Winston, N. C.	Union Guano for Cotton and Tobacco	Clinton	8 16	1 36	1 42	2 78	3 38	5 87	25 48
Brand claiming										
9517	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Vegetable Guano	Andrews	8 54	2 54	1 14	3 68	4 47	5 46	26 95

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.														
Brands claiming														
9759	Contentnea Guano Co., Wilson, N. C.	S-4-50-7 for Tobacco	Nashville	8 00			3 70	4 50	7 00					\$30 44
4487	do	do	Fremont	8 40	2 60	1 30	3 90	4 74	7 78	21	7 57	16	32 50	
8820	Farmers Cotton Oil Co., Wilson, N. C.	Dean's Special Guano	Selma	8 42			3 46	4 21	9 10	2 61	6 49	1 96	32 12	
9225	Va.-Car. Chemical Co., Richmond, Va.	Muse's Special	Kenly	7 40	2 46	2 02	4 48	5 45	8 21				34 51	
				8 16	.96	1 26	2 22	2 70	8 83				26 38	
Brand claiming														
9659	Va.-Car. Chemical Co., Richmond, Va.	Durham Fert. Co.'s Special Plant and Truck Fertilizer.	Coinjock	8 00			4 11	5 00	3 00				27 76	
				8 10	.10	3 88	3 98	4 84	2 99				27 29	
Brands claiming														
9432	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Lobos Guano	Newport	8 00			4 11	5 00	5 00				29 96	
9715	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Virginia Fertilizer Co.'s Virginia Trucker.	Asheville	7 55	2 86	1 24	4 10	4 98	5 92				30 53	
				8 90	2 81	.52	3 36	4 09	3 32				25 77	
Brands claiming														
8972	Southern Exchange Co., Maxton, N. C.	McKinnon's Special Truck Formula.	Maxton	8 00			4 11	5 00	7 00				32 16	
				8 30	3 02	.98	4 00	4 86	7 41				32 42	
4693	do	McKinnon's Special Truck Formula.	Wilmington	7.98	3.02	.88	3 90	4 74	6 92				31 17	
9771	do	Melon Grower	Maxton	8 01	3 08	.98	4 06	4 94	8 95				31 90	
Brand claiming														
9834	Pamlico Chemical Co., Washington, N. C.	United States Tobacco Guano	Washington	8.00			4 11	5 00	10 00				35 46	
				9 07	.76	3 08	3 84	4 67	7 48	27	7 21	20	32 52	

Brands claiming		8.50	1.65	2.00	2.00	16.78			
9714	Pocomoke Guano Co., Norfolk, Va. Electric Crop Grower	8.13	1.14	.48	1.62	1.97	1.93	16.24	
9127	do. Pocomoke Superphosphate	8.94	1.10	.54	1.64	1.99	2.03	17.17	
8906	do. do. Edenton	8.42	1.34	.46	1.80	2.19	1.97	17.30	
Brand claiming		8.50	2.06	2.50	2.50	19.05			
9124	Pocomoke Guano Co., Norfolk, Va. Cinco Tobacco Grower	8.11	1.56	.54	2.10	2.55	2.35	18.70	
Brands claiming		8.50	2.26	2.75	2.00	19.34			
9881	Va.-Car. Chemical Co., Richmond, Va. Allison & Addison's Anchor Brand Tobacco Fertilizer	9.35	1.90	.20	2.10	2.55	1.95	4.67	19.38
9513	do. do. Marshall	9.00	2.42	.42	2.84	3.45	2.11	2.11	22.35
Brand claiming		8.75	1.85	2.25	4.00	20.04			
9806	Navassa Guano Co., Wilmington, N. C. Farmers' Mixture	9.45	20	1.36	1.56	1.89	3.35	18.74	
Brands claiming		9.00	82	1.00	2.00	13.74			
9484	American Fertilizing Co., Norfolk, Va. American Bone Mixture	8.79	.62	.48	1.10	1.34	2.32	15.08	
9639	Rasin-Monumental Co., Baltimore, Md. Baltimore Special Mixture	9.92	.70	.46	1.16	1.41	1.89	15.88	
9410	Royster, F. S., Guano Co., Norfolk, Va. Royster's Special 1-9-2 Guano	8.84	.62	.38	1.00	1.22	2.45	14.85	
9591	Va.-Car. Chemical Co., Richmond, Va. Allison & Addison's Little Giant Grain and Grass Mixture	9.69	.60	.46	1.06	1.29	2.06	15.44	
Brands claiming		9.00	82	1.00	3.00	14.84			
8985	Patapsco Guano Co., Baltimore, Md. Coon Brand Guano	9.72	.54	.38	.92	1.12	2.81	15.70	
9489	Va.-Car. Chemical Co., Richmond, Va. Bigelow's Crop Guano	9.08	.58	.48	1.06	1.29	3.16	16.10	
9644	do. do. Hendersonville	8.40	.70	.56	1.26	1.53	2.95	16.10	
9883	Union Guano Co., Winston, N. C. B. S. Ammoniated Guano	11.44	1.18	.28	1.46	1.78	2.84	19.55	
Brand claiming		9.00	1.00	1.22	2.00	14.50			
9420	Robertson Fertilizer Co., Norfolk, Va. Robertson's Blood and Bone Mixture	9.41	.64	.42	1.06	1.29	1.93	15.00	
Brands claiming		9.00	1.65	2.00	1.00	16.13			
9039	Va.-Car. Chemical Co., Richmond, Va. Allison & Addison's Star Brand Guano	9.24	.94	.72	1.66	2.02	1.14	16.54	
9395	do. do. Durham Ammoniated Fertilizer Helena	10.40	.78	.64	1.42	1.73	.84	16.36	

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.								Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
MIXED FERTILIZERS.													
Brands claiming				9 00			1 65	2 00	3 00			\$18 33	
9791	Columbia Guano Co., Norfolk, Va.	Roanoke Ammoniated Guano	China Grove	8 99	1 36	.54	1 90	2 31	3 11			19 49	
8845	Craven Chemical Co., New Bern, N. C.	Prolix Special Guano	LaGrange	8 61	.70	.94	1 64	1 99	3 34			18 31	
9005	Navassa Guano Co., Wilmington, N. C.	Osceola Guano	Cornelius	9 40	1 14	.56	1 70	2 07	2 59			18 45	
9704	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special Ammoniated Dissolved Bone	Norwood	9 32	2 00	.66	2 66	3 23	2 07			21 84	
9705	Powhatan Chemical Co., Richmond, Va.	North Carolina Favorite	Cornelius	8 47	1 06	.64	1 70	2 07	3 28			18 37	
9400	Royster, F. S., Guano Co., Norfolk, Va.	Viking Ammoniated Guano	Indian Trail	9 61	1 22	.54	1 76	2 14	2 92			19 25	
9236	Southern Cotton Oil Co., Gibson, N. C.	Razen	Clarkton	9 31	.52	1 20	1 72	2 09	3 07			18 98	
9647	Swift Fertilizer Works, Atlanta, Ga.	Swift's Farmers' Favorite High Grade Guano	Hendersonville	8 34	1 24	.88	2 12	2 58	3 42			20 17	
9706	Union Guano Co., Winston, N. C.	Farmers' Blood and Bone Guano	Cornelius	9 44	.86	.70	1 56	1 89	2 80			18 13	
9465	do.	Union Complete Cotton Mixture	Cary	9 54	1 56	1 38	2 91	3 57	2 24			23 40	
Brands claiming				9 00			1 85	2 25	1 00			16 97	
9709	Ashepool Fertilizer Co., Charleston, S. C.	Standard Ashepool Fertilizer	Davidson	9 55	1 32	.66	1 98	2 41	1 60			18 67	
9401	Bradley Fertilizer Co., Boston, Mass.	Standard B. D. Sea Fowl Guano	Charlotte	9 32	1 44	.54	1 98	2 41	1 59			18 45	
Brands claiming				9 00			1 85	2 25	4 00			20 27	
9490	American Agricultural Chemical Co., New York, N. Y.	Lazaret (or Retriever Animal Bone Fertilizer.	Gastonia	9 58	1 34	.50	1 84	2 24	4 07			20 83	
9751	do.	Zell's Victoria Animal Bone Compound.	Middlesex	8 99	1 48	.70	2 18	2 65	4 27			22 74	

Brands claiming		8 50	1 85	2 00	2 00	16 78		
9714	Pocomoke Guano Co., Norfolk, Va. Electric Crop Grower Sylva	8 13	1 14	48	1 62	1 97	1 93	18 24
9727	do Pocomoke Superphosphate Dover	8 94	1 10	54	1 64	1 99	2 03	17 17
8906	do do Edenton	8 42	1 31	46	1 80	2 19	1 97	17 30
Brand claiming		8 50			2 06	2 50	2 50	19 05
9124	Pocomoke Guano Co., Norfolk, Va. Cinco Tobacco Grower Dover	8 11	1 56	54	2 10	2 55	2 35	18 70
Brands claiming		8 50			2 26	2 75	2 00	19 34
9881	Va.-Car. Chemical Co., Richmond, Va. Allison & Addison's Anchor Brand Tobacco Fertilizer Roxboro	9 35	1 90	20	2 10	2 55	1 95	19 38
9543	do do Marshall	9 00	2 42	42	2 84	3 45	2 11	22 35
Brand claiming		8 75			1 85	2 25	4 00	20 04
9806	Nayassa Guano Co., Wilmington, N. C. Farmers' Mixture Selma	9 45	20	1 36	1 56	1 89	3 35	18 74
Brands claiming		9 00			82	1 00	2 00	13 74
9484	American Fertilizer Co., Norfolk, Va. American Bone Mixture Rudin	8 79	62	48	1 10	1 34	2 32	15 08
9669	Rash-Monumental Co., Baltimore, Md. Baltimore Special Mixture Stoneville	9 92	70	46	1 16	1 11	1 69	15 88
9110	Royster, F. S., Guano Co., Norfolk, Va. Royster's Special 1-9-2 Guano Kernersville	8 84	62	38	1 00	1 22	2 45	11 85
9591	Va.-Car. Chemical Co., Richmond, Va. Allison & Addison's Little Giant Rural Hall Grain and Grass Mixture	9 69	60	46	1 06	1 29	2 06	15 41
Brands claiming		9 00			82	1 00	3 00	14 84
8985	Palapasco Guano Co., Baltimore, Md. Coon Brand Guano Mooresboro	9 72	54	38	92	1 12	2 81	15 70
9489	Va.-Car. Chemical Co., Richmond, Va. Bigelow's Crop Guano Lincolnton	9 08	58	48	1 06	1 29	3 16	16 10
9644	do do Hendersonville	8 40	70	56	1 26	1 53	2 95	16 10
9883	Union Guano Co., Winston, N. C. B. S. Ammoniated Guano Hendersonville	11 44	1 18	28	1 46	1 78	2 84	19 55
Brand claiming		9 00			1 00	1 22	2 00	14 50
9420	Robertson Fertilizer Co., Norfolk, Va. Robertson's Blood and Bone Mixture Cherryville	9 41	64	42	1 06	1 29	1 93	15 00
Brands claiming		9 00			1 65	2 00	1 00	16 13
9059	Va.-Car. Chemical Co., Richmond, Va. Allison & Addison's Star Brand Durham Guano	9 24	94	72	1 66	2 02	1 14	16 54
9595	do do Durham Ammoniated Fertilizer Helena	10 40	78	64	1 42	1 73	84	16 86

8987	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special High Grade Fer- tilizer.	Cherryville	10 55	1 78	68	2 46	2 99	3 05	-----	23 18
8823	Patapsco Guano Co., Baltimore, Md.	Patapsco Tobacco Fertilizer.	Selma	9 44	1 78	66	2 44	2 97	2 97	-----	22 01
9483	Pocahontas Guano Co., Lynchburg, Va.	Pocahontas Special Tobacco Fertilizer.	Ruffin	8 80	1 92	72	2 64	3 21	3 55	-----	22 91
9034	Scotland Neck Guano Co., Scotland Neck, N. C.	Josey's Cotton-seed Meal and Fish Scrap.	Ayden	8 53	.94	1 34	2 28	2 77	3 92	-----	21 56
9777	-----do.	Old Halifax Cotton-seed Meal and Fish Scrap Tob. Guano.	Whitakers	9 79	1 04	1 26	2 30	2 80	3 44	-----	22 25
9237	Southern Cotton Oil Co., Gibson, N. C.	Uncle Sam Fertilizer.	Clarkton	9 17	1 20	1 44	2 64	3 21	3 25	-----	22 91
9815	Vance Guano Co., Henderson, N. C.	Farmers' Union High Grade.	Henderson	9 29	1 26	1 28	2 54	3 09	3 71	-----	23 11
8824	Va.-Car. Chemical Co., Richmond, Va.	N. and R.'s Best	Selma	9 77	2 10	.54	2 64	3 21	2 99	-----	23 17
	Brand claiming			9 00	-----	-----	2 47	3 00	4 00	-----	22 87
9342	Va.-Car. Chemical Co., Richmond, Va.	Great Texas Cotton Grower.	Durham	9 89	1 74	.52	2 26	2 75	4 07	-----	22 87
9799	Farmville Oil and Fertilizer Co., Farm- ville, N. C.	Green County Special for To- bacco.	Arthur	9 00	-----	-----	2 67	3 25	5 00	-----	24 81
	Brands claiming			10 49	1 48	1 32	2 80	3 40	3 54	-----	25 09
9308	American Fertilizer Co., Norfolk, Va.	Pitt County Special Fertilizer.	Greenville	9 00	-----	-----	2 88	3 50	5 00	-----	25 70
9384	-----do.	Special Formula Guano for Tobacco.	Lumberton	9 44	2 34	68	3 02	3 67	5 27	-----	26 98
	Brand claiming			10 39	1 70	.50	2 20	2 67	2 14	-----	20 84
9835	Pamlico Chemical Co., Washington, N. C.	Pitt County High Grade To- bacco Guano.	Washington	9 00	-----	-----	3 29	4 00	4 00	-----	26 32
9191	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s Durham Pinetops High Grade.	Pinetops	9 55	2 64	56	3 20	3 89	3 64	-----	26 64
	Brand claiming			9 25	-----	-----	2 06	2 50	2 00	-----	19 18
9003	Patapsco Guano Co., Baltimore, Md.	Patapsco Guano	Mooresville	9 80	1 36	.58	1 94	2 36	2 54	-----	19 76
	Brand claiming			10 00	-----	-----	82	1 00	3 00	-----	15 74
9519	Adair, A. D., & McCarty Bros., Chatta- nooga, Tenn.	McCarty's Corn Special	Hazelwood	9 60	.52	64	1 16	1 41	2 46	-----	16 15
	Brands claiming			10 00	-----	-----	1 65	2 00	2 00	-----	18 13
9520	Adair, A. D., & McCarty Bros., Chatta- nooga, Tenn.	McCarty's High Grade Corn Grower.	Hazelwood	10 08	.50	1 24	1 74	2 11	2 16	-----	18 76
9624	American Fertilizer Co., Norfolk, Va.	American Standard Cotton Grower.	Lawndale	9 37	90	1 08	1 98	2 41	2 78	-----	19 81

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.								Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.													
Brands claiming													
9522	Adair, A. D., & McCarty Bros., Chattanooga, Tenn.	David Harum Extra High Grade Guano.	Hazelwood	10 00	2 32	1 08	3 40	4 13	4 41	.....	.....	.....	\$27 64
9769	Peruvian Guano Co., Charleston, S. C.	Chincha Island High Grade Peruvian Mixture.	Maxton	11 25	1 74	1 12	2 86	3 48	3 85	.....	.....	.....	26 46
Brand claiming													
9635	Powhatan Chemical Co., Richmond, Va.	Magic Corn Special Fertilizer.	Greensboro	11 38	48	86	1 34	1 63	2 11	.....	.....	.....	18.19
Brand claiming													
9434	Baugh & Sons Co., Norfolk, Va.	Baugh's Southern States Guano Grifton for Bright Tobacco.	.....	7 00	.....	.....	2 06	2 50	7 00	.....	.....	.....	22 65
Brand claiming													
9879	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Formula 44 for Bright Wrap and Smokers.	Wentworth	8 56	1 98	62	2 60	3 16	3 48	13	3 35	10	22 45
Brands claiming													
9823	Va.-Car. Chemical Co., Richmond, Va.	Plant Bed and High Grade Tobacco Grower.	Old Trap	8 00	80	1 60	2 40	2 92	6 25	6 25	.....	5 85	24 15
9663	do.	do.	Richland	5 54	2 60	1 65	4 26	5 18	7 12	20	6 92	15	20 71
Brand claiming													
9143	American Fertilizer Co., Norfolk, Va.	Stable Manure Substitute.	Dunn	7 72	1 30	82	2 12	2 58	3 00	.....	.....	.....	19 15
Brands claiming													
9242	American Fertilizer Co., Norfolk, Va.	American Fish Scrap Guano.	Lamberton	7 00	.....	.....	3 29	4 00	4 00	.....	.....	.....	24 52
9025	do.	do.	Greenville	8 28	1 68	1 50	3 18	3 87	3 42	.....	.....	.....	24 57
Brand claiming													
9025	do.	do.	Greenville	7 07	1 00	2 22	3 22	3 91	3 79	.....	.....	.....	24 05

4555	do	Rockingham	7 62	3 04	3 70	3 70	23 70
Brand claiming							
9728	Union Guano Co., Winston, N. C.	Clinton	7 00	3 29	4 00	5 00	25 62
Brands claiming							
	Union Truck Guano	Clinton	7 75	2 82	3 48	5 67	25 26
8859	Baugh & Sons Co., Norfolk, Va.	Glover's Special Potato Guano	7 00	3 29	4 00	8 00	20 96
		Elizabeth City	8 51	2 52	98	3 50	4 26
9158	Va.-Car. Chemical Co., Richmond, Va.	South Mills	7 53	2 74	64	3 38	4 11
Brand claiming							
	Va.-Car. Co.'s Pasquotank Truck	South Mills	7 00	2 50	1 12	3 62	4 40
9563	Patapsco Guano Co., Baltimore, Md.	Greenville	7 08	2 50	1 12	3 62	4 40
Brands claiming							
	Money Maker Guano	Greenville	7 00	4 11	5 00	5 00	29 10
9159	American Fertilizer Co., Norfolk, Va.	American Irish Potato Grower	7 12	3 22	1 46	4 68	5 69
9695	Berkley Chemical Co., Norfolk, Va.	Edenton	7 29	2 78	1 18	3 96	4 81
9436	Covell, Swan & McCotter Co., Bayboro, N. C.	Beaufort	7 02	2 08	2 82	4 90	5 96
9369	Eastern Cotton Oil Co., Hertford, N. C.	Edenton	7 07	1 64	2 08	3 72	4 52
8902	Pamlico Chemical Co., Washington, N. C.	Pamlico Favorite Potato Guano	8 14	1 80	2 48	4 28	5 20
9055	Patapsco Guano Co., Baltimore, Md.	Bethel	7 80	3 04	1 14	4 18	5 08
9354	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Wadesboro	8 42	3 32	54	3 86	4 69
8907	Pocomoke Guano Co., Norfolk, Va.	Hertford	7 55	3 24	1 10	4 34	5 28
9052	Royster, F. S., Guano Co., Norfolk, Va.	Bethel	7 39	3 08	1 00	4 08	4 96
9010	Swift Fertilizer Works, Wilmington, N. C.	Burgaw	7 52	2 02	1 92	3 94	4 79
Brands claiming							
	Swift's Early Truck	Burgaw	7 00	4 11	5 00	6 00	30 16
9092	Upshur, R. L., Guano Co., Norfolk, Va.	Elizabeth City	6 80	2 66	1 44	4 10	4 98
9203	do	Edenton	7 12	2 86	1 24	4 10	1 98
Brands claiming							
	Upshur's Farmers' Favorite Guano	Edenton	7 00	4 11	5 00	7 00	31 30
9093	American Fertilizer Co., Norfolk, Va.	Lumberton	7 75	1 92	1 76	3 68	4 47
8835	Navassa Guano Co., Wilmington, N. C.	Rockingham	8 55	1 72	1 80	3 52	4 28
8951	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Plymouth	8 84	3 04	1 40	4 44	5 10

Brand claiming		6 00	2 47	3 00	7 00	23 47
9594	Ober, G., & Sons Co., Baltimore, Md.	7 76	1 84	88	2 72 3 31	6 83 3 26 3 57 2 45 25 92
Brands claiming		6 00	3 29	4 00	4 00	23 62
9315	Imperial Co., Norfolk, Va.	6 95	1 80	1 42	3 22 3 91	4 31 24 52
8920	Va.-Car. Chemical Co., Richmond, Va.	5 54	1 36	2 10	3 46 4 21	3 35 23 20
Brand claiming		6 00	3 29	4 00	7 00	26 96
9123	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	8 62	1 00	2 41	3 44 4 18 5 23	2 00 3 23 1 58 27 95
Brands claiming		6 00	3 29	4 00	8 00	28 44
9077	Acme Mfg. Co., Wilmington, N. C.	5 38	1 94	1 36	3 30 4 01	9 11 28 72
8966	Wilson Chemical Co., Wilson, N. C.	6 62	1 80	1 50	3 30 4 01	9 06 29 78
Brands claiming		6 00	4 11	5 00	5 00	28 16
9458	Hubbard Fertilizer Co., Baltimore, Md.	5 04	2 26	1 38	3 64 4 43	4 61 24 89
8948	Imperial Co., Norfolk, Va.	6 22	2 34	1 60	3 94 4 79	5 11 27 77
9206	Young, J. R., Fertilizer Co., Norfolk, Va.	6 13	2 80	1 26	4 06 6 03	5 25 28 34
Brands claiming		6 00	4 11	5 00	7 00	30 36
9024	American Fertilizer Co., Norfolk, Va.	6 20	2 16	1 72	3 88 4 72	8 46 31 18
9154	Baltimore Fertilizer Co., Baltimore, Md.	6 91	2 92	1 20	4 12 5 01	6 85 31 06
8857	Baugh & Sons Co., Norfolk, Va.	6 44	3 30	88	4 18 5 08	7 28 31 36
8860	Eastern Cotton Oil Co., Hertford, N. C.	8 05	1 60	2 24	3 84 4 67	7 84 32 00
9201	Marlin, D. B., Co., Richmond, Va.	6 91	2 52	1 44	3 96 4 81	7 52 30 94
8862	Miller Fertilizer Co., Baltimore, Md.	6 30	3 00	1 16	4 16 5 06	6 98 30 82
9648	Patapasco Guano Co., Baltimore, Md.	5 78	06	4 04	4 10 4 98	7 19 30 33
9649	do	5 47	3 26	56	3 82 4 61	6 39 27 99
9281	Rasin-Monumental Co., Baltimore, Md.	6 27	2 34	1 80	4 14 5 03	6 83 30 54
9658	Va.-Car. Chemical Co., Richmond, Va.	6 06	2 22	1 80	4 02 4 89	6 92 29 95
9841	do	7 40	2 62	1 30	3 92 4 77	5 59 29 27

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.							Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Potash from Sulphate.	Potash from Chloride.		
MIXED FERTILIZERS.												
Brands claiming				6 00			4 11	5 00	7 00		\$30 36	
9646	Va.-Car. Chemical Co., Richmond, Va.	V.-C. Co.'s Special Truck Guano.	Tryon	7 92	2 12	1 30	3 42	1 16	6 29		28 41	
9205	Young, J. R., Fertilizer Co., Norfolk, Va.	Paspotank 5-6-7 Potato Guano	Elizabeth City	6 03	2 63	1 24	3 90	4 74	5 91		28 31	
Brand claiming				6 00			4 94	6 00	6 00		32 75	
8904	Mapes Formula and Peruvian Guano Co., New York, N. Y.	Mapes' Vegetable Manure	Washington	6 71	4 66	.60	5 26	6 40	7 96		36 89	
Brands claiming				6 00			5 76	7 00	5 00		35 08	
9082	Baugh & Sons Co., Norfolk, Va.	Baugh's 7 Per Cent Potato Guano.	High Point	6 49	4 72	1 08	5 80	7 05	5 66		36 43	
9696	Berkley Chemical Co., Norfolk, Va.	Royal Truck Guano	Edenton	6 59	14	5 60	5 74	6 98	5 72		36 33	
9368	Bragaw Fertilizer Co., Washington, N. C.	Riverview Truck	Washington	6 46	3 42	2 30	5 72	6 95	6 00		36 44	
9306	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Special Truck Fertilizer.	Sunbury	5 60	4 10	1 76	5 86	7 12	4 12		34 18	
9530	Royster, F. S., Guano Co., Norfolk, Va.	Potato Guano	Pritchard's Siding	6 22	4 96	.80	5 76	7 00	5 32		35 64	
4304	Va.-Car. Chemical Co., Richmond, Va.	Travers' 7 Per Cent Truck Fertilizer.	Elizabeth City	7 14			5 66	6 88	4 56		33 21	
Brand claiming				5 00			5 76	7 00	5 00		34 19	
9279	Imperial Co., Norfolk, Va.	Special 7 Per Cent for Potatoes	Edenton	5 51	3 45	2 16	5 61	6 82	5 42		34 55	
Brands claiming				5 00			8 25	10 00	2 50		41 90	
8807	Craven Chemical Co., New Bern, N. C.	Craven Chemical Co.'s Truck Guano.	Vanceboro	6 43	4 40	2 48	6 58	8 00	2 54		36 22	

8849	Pamlico Chemical Co., Washington, N. C.	Cowell's Great Cabbage Grower	Washington	5 97	5 92	2 50	8 42	10 24	3 82	44 94
	Brand claiming			4 00			2 47	3 00	5 00	19 47
9800	Imperial Co., Norfolk, Va.	Cubanola Tobacco Guano	Stokes	4 18	1 51	1 20	2 74	3 33	5 63	11 57
	Brand claiming			4 00			3 29	4 00	4 00	21 86
9014	Armour Fertilizer Works, Wilmington, N. C.	Armour's Harvey's Special Fer- tilizer.	Wallace	4 21	2 00	1 34	3 34	3 94	4 11	22 34
	Brand claiming			4 00			3 29	4 00	6 00	24 06
9662	Norfolk Fertilizer Co., Norfolk, Va.	Oriana High Grade Tobacco Guano.	Richlands	4 97	2 44	92	3 36	4 09	6 04	13 92
	Brand claiming			4 00			4 84	6 00	4 00	28 75
9018	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 4-6-4 Special	Greenville	4 90	2 78	1 96	4 74	5 76	4 79	20 59
	Brand claiming			4 00			8 23	10 60	4 00	42 61
9466	Va.-Car. Chemical Co., Richmond, Va.	V.-C. Co.'s 10 Per Cent Top Dresser, Extra High Grade.	Raleigh	4 57	7 08	91	8 02	9 75	3 07	41 17
	Brand claiming			3 00			8 23	10 00	4 00	42 70
9864	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh Top Dresser	Henderson	3 54	5 28	2 36	7 64	9 29	5 10	40 88
	Brand claiming			12 60			1 65	2 00		17 73
9016	Home Fertilizer and Chemical Co., Bal- timore, Md.	Boykin's Dissolved Animal Bone.	Wallace	13 21			1 64	1 99		18 78
	Brands claiming						7 40	9 00	3 00	34 38
9271	Piedmont-Mount Airy Guano Co., Bal- timore, Md.	Boykin's Top Dresser	Waxlaw				6 88	8 36	4 04	33 34
9774	Home Fertilizer and Chemical Co., Bal- timore, Md.	Cerealite Top Dresser	Lumberton				8 09	9 84	4 84	39 30
	Brand claiming						5 76	7 00	7 00	31 93
9017	Home Fertilizer and Chemical Co., Bal- timore, Md.	Home Fertilizer	Wallace				7 84	9 53	8 20	41 95
	Brand claiming			7 00					5 00	11 10
9698	Columbia Guano Co., Norfolk, Va.	Crown Brand Peanut Grower	Edenton	7 17					1 98	11 93
	Brands claiming			8 00					4 00	11 60
9528	Adair, R. D., & McCarty Bros., Chat- tanooga, Tenn.	Adair's Special Potash Mixture	Hazelwood	7 62					1 05	11 31
9593	American Fertilizer Co., Norfolk, Va.	American Special Potash Mix- ture for Wheat.	Rural Hall	10 07					2 75	12 09
9418	Columbia Guano Co., Norfolk, Va.	Columbia 8 and 4 Bone and Potash Mixture.	Greensboro	8 49					3 91	11 94

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.							Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Nitrate.		Potash from Sulphate.	Chlorine.
MIXED FERTILIZERS.												
Brands claiming												
9640	Powhatan Chemical Co., Richmond, Va.	Magie Grain and Grass Grower	Greensboro	8 00			4 00					\$11 60
9639	Reidsville Fertilizer Co., Reidsville, N. C.	Bone and Potash	Reidsville	9 32			3 75					12 51
9475	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 8 and 1 Bone and Potash Mixture.	Kenersville	8 20			3 89					11 66
9761	Union Guano Co., Winston, N. C.	Union Wheat Mixture	High Point	7 99			3 70					11 26
9637	Va.-Car. Chemical Co., Richmond, Va.	Jones' Grain Special	Greensboro	9 02			3 50					11 97
9346	do.	Va. State Fert. Co.'s Gilt Edge Brand Dis. Bone and Potash.	Winston	8 94			3 39					11 77
Brands claiming												
9250	Acme Mfg. Co., Wilmington, N. C.	Acme Bone and Potash	Maxton	10 00			2 00					11 20
9379	American Fertilizer Co., Norfolk, Va.	Dissolved Bone and Potash for Corn and Wheat.	Lillington	10 48			2 22					11 87
9587	Armour Fertilizer Works, Wilmington, N. C.	Armour's Phosphate and Potash, No. 1.	Siler City	12 52			1 75					13 19
9527	do.	do.	Bryson City	10 73			1 22					11 00
9720	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Superior Potato and Wheat Fertilizer.	Asheville	9 49			1 76					10 48
9712	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Bone and Potash Mixture.	Albemarle	9 71			2 95					11 98
9668	Craven Chemical Co., New Bern, N. C.	Trent Bone and Potash	Trenton	9 70			2 31					11 27
9336	Hampton Guano Co., Norfolk, Va.	Dauntless Potash Mixture	Jacksonville	10 32			2 15					11 65
9370	Imperial Co., Norfolk, Va.	Bone and Potash	Edenton	10 79			2 07					11 99
				10 15			2 05					11 39

9787	Martin, D. B., Co., Richmond, Va.	Martin's Potash and Soluble Bone.	Taylorsville.	11.17	2.02	12.27
9288	do.	do.	Elizabeth City.	10.79	2.13	12.05
9456	Miller Fertilizer Co., Baltimore, Md.	Clinch Phosphate.	Windsor.	10.13	2.09	11.41
9549	Patapsco Guano Co., Baltimore, Md.	Patapsco Soluble Phosphate and Potash.	Hendersonville.	9.95	2.24	11.42
9686	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Farmers' Bone and Potash.	Burlington.	10.11	2.99	12.39
9788	Pocahontas Guano Co., Lynchburg, Va.	Carrington's Superior Grain Mixture.	Taylorsville.	9.39	1.84	10.47
9479	Pocomoke Guano Co., Norfolk, Va.	10-2 Potash Mixture.	Centerville.	10.07	2.15	11.43
9416	Powhatan Chemical Co., Richmond, Va.	Bone and Potash Mixture.	Greensboro.	10.39	1.85	11.38
9638	Reidsville Fertilizer Co., Reidsville, N. C.	Bone and Potash.	Reidsville.	10.95	1.95	12.00
9139	Richmond Guano Co., Richmond, Va.	Bone and Potash Mixture.	Dunl.	10.10	2.07	11.37
9675	Robertson Fertilizer Co., Norfolk, Va.	Level Run Dissolved Bone and Potash.	Liberty.	9.82	1.79	10.81
8992	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.	Cherryville.	10.09	1.66	10.91
9627	Southern Cotton Oil Co., Shelby, N. C.	Magnolia Bone and Potash Standard.	Ellenboro.	10.86	1.84	11.80
8996	Swift Fertilizer Works, Atlanta, Ga.	Swift's Wheat Grower Standard Grade Phosphate and Potash.	Moorestville.	9.35	1.63	10.21
9089	Union Guano Co., Winston, N. C.	Union Bone and Potash.	Lexington.	10.04	2.41	11.69
9327	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Va. Fert. Works Bone and Potash Compound.	Hickory.	10.56	1.91	11.60
9304	do.	Durham Fertilizer Co.'s Blue Ridge Wheat Grower.	Statesville.	9.35	2.12	10.75
9601	do.	Durham Fertilizer Co.'s Durham Helena Bone and Potash Mixture.	Helena.	10.27	1.97	11.41
8997	do.	Old Dom. Guano Co.'s Old Dom. Alkaline Bone and Potash.	Moorestville.	8.70	2.30	10.58
8991	do.	Southern Chemical Co.'s Mammoth Corn Grower.	Salisbury.	10.87	1.70	11.65
9875	do.	do.	Statesville.	9.93	1.80	10.92
9477	do.	J. G. Tinsley & Co.'s Tinsley's Bone and Potash Mixture.	Centerville.	10.95	1.80	11.83
9478	do.	S. W. Travers & Co.'s Capital Bone and Potash Compound.	Centerville.	10.97	1.67	11.71
9164	do.	V. C. C. Co.'s Standard Bone and Potash.	South Mills.	8.62	1.95	9.91
9717	Winborne-Brown Guano Co., Norfolk, Va.	Winborne Guano Co.'s Soluble Bone and Potash.	Spiller's Ferry.	10.45	2.33	11.47

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.		
MIXED FERTILIZERS.														
Brands claiming														
9731	Acme Mfg. Co., Wilmington, N. C.	Acme Bone and Potash	Rosedoro	10 00						4 00				\$13 40
9455	American Agricultural Chemical Co., New York, N. Y.	Zell's High Grade Potash	Windsor	9 71						3 89				13 02
9380	American Fertilizer Co., Norfolk, Va.	Double Dissolved Bone and Potash	Lillington	10 36						3 61				13 29
9392	Armour Fertilizer Works, Wilmington, N. C.	Superphosphate	Wilmington	12 47						2 43				13 89
9721	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Special XXX Wheat Grower	Asheville	9 65						3 90				12 97
9795	Atlantic Chemical Co., Norfolk, Va.	10 and 4 Bone and Potash Mixture	China Grove	10 35						2 55				12 12
9163	Berkley Chemical Co., Norfolk, Va.	Berkley Plant Food	Mackey's Ferry	10 49						3 75				13 56
9732	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Bone and Potash	Clinton	10 36						3 96				13 68
9492	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Special Bone and Potash Mixture	Gastonia	10 67						3 85				13 84
9227	Columbia Guano Co., Norfolk, Va.	Columbia 10 and 4 Bone and Potash Mixture	Hickory	10 57						3 71				13 60
9589	Farmers Guano Co., Raleigh, N. C.	Special Bone and Potash Mixture	Siler City	9 85						3 65				12 89
9378	Hampton Guano Co., Norfolk, Va.	Hampton Crop Grower	Lillington	10 62						3 90				13 85
9443	Navassa Guano Co., Wilmington, N. C.	Wheat and Grass Grower	Lucama	10 88						4 00				14 19
9493	Patapsco Guano Co., Baltimore, Md.	Patapsco 10 and 4 Potash Mixture	Terrell	10 37						3 97				13 70
9762	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Levering's Potashed Bone	High Point	9 95						4 22				13 69
9789	Pocahontas Guano Co., Lynchburg, Va.	Wabash Wheat Mixture	Taylorsville	10 52						4 42				14 33
				9 75						3 71				12 85

9430	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Bone and Potash Mixture.	Centerville.	10 27	4 02	13 66
9588	Powhatan Chemical Co., Richmond, Va.	Magie Bone and Potash Mixture.	Greensboro	9 63	3 98	13 04
9676	Robertson Fertilizer Co., Norfolk, Va.	Sky-scraper Bone and Potash Compound.	Liberty	9 42	3 64	12 48
4517	Rowan Chemical Co., Salisbury, N. C.	Rowan Grain Mixture.		9 95	3 33	12 62
9474	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 10 and 4 Bone and Potash Mixture.	Kernersville.	10 02	4 54	14 01
9626	Southern Cotton Oil Co., Shelby, N. C.	Conqueror Bone and Potash.	Shelby.	9 85	5 02	14 39
9417	Swift Fertilizer Works, Wilmington, N. C.	Swift's Farmers' Home High Grade Phosphate and Potash.	Clarkton	10 15	3 71	13 21
9573	do.	do.	Sanford	9 43	4 57	13 51
9629	Union Guano Co., Winston, N. C.	Quaker Grain Mixture.	Hickory	11 38	3 28	13 85
9337	do.	Union 10 and 4 Bone and Potash.	Clinton	10 70	4 07	14 10
9476	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s S. W. Special Bone and Pot. Mix.	Centerville	10 00	3 78	13 16
9305	do.	Old Dominion Guano Co.'s Obelisk Brand Bone and Pot.	Statesville	9 75	3 92	13 09
9650	do.	Southern Chemical Co.'s Winter Grain Mixture.	Hendersonville	8 90	3 79	12 16
8995	do.	V.-C. Co.'s Special Potash Mixture.	Mooreville	10 07	2 93	12 28
Brands claiming						
9678	Armour Fertilizer Works, Wilmington, N. C.	Armour's Phosphoric Acid and Potash.	Biscoe	10 52	4 14	14 02
9417	Columbia Guano Co., Norfolk, Va.	Columbia 10-5 Bone and Potash Mixture.	Greensboro	10 30	4 79	11 54
9502	Contentnea Guano Co., Wilson, N. C.	Bone and Potash Mixture.	Four Oaks	10 34	5 35	15 19
9688	Union Guano Co., Winston, N. C.	Union 10-5 Bone and Potash.	Winston	9 67	4 75	13 93
8801	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s Alpine Mixture.	Raleigh	11 57	4 16	14 99
9594	do.	Va. State Fert. Co.'s Mountain Top Bone and Potash.	Greensboro	9 90	4 76	14 15
Brands claiming						
9687	Union Guano Co., Winston, N. C.	Liberty Bell Crop Grower	Burlington	10 48	1 40	10 89
9344	Va.-Car. Chemical Co., Richmond, Va.	Durham Fert. Co.'s Great Texas Wheat and Corn Grower.	Durham	10 48	1 74	11 35
Brand claiming						
9515	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Home & Sons' High Grade Bone and Potash.	Garner	10 97	5 00	15 00

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.								Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.		Chlorine.
MIXED FERTILIZERS.													
Brands claiming				11.00					5.00				\$15.40
9533	Martin, D. B., Co., Richmond, Va.	Martin's Potash Soluble Bone	Winfall	9.73					4.55				13.77
9174	Patapsco Guano Co., Baltimore, Md.	Patapsco High Grade Phosphate and Potash.	China Grove.	10.50					5.39				15.38
9514	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 10 and 5 Bone and Potash Mixture.	Garnet	11.12					4.10				14.52
8803	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Quickstep Bone and Potash.	Raleigh	10.92					6.20				16.65
Brand claiming				12.00					6.00				17.40
9229	Union Guano Co., Winston, N. C.	Union 12-6 Bone and Potash	Newton	11.09					4.89				15.35
RAW OR UNMIXED FERTILIZER MATERIALS.													
Brands claiming				12.00									9.60
9523	Adair, A. D., & McCarty Bros., Chattanooga, Tenn.	Adair's Dissolved Bone	Hazewood	10.81									8.65
9674	Ashpoo Fertilizer Co., Charleston, S. C.	High Grade Ashpoo Acid Phosphate.	Lexington	15.80									12.64
9347	Va.-Car. Chemical Co., Richmond, Va.	Old Dominion Guano Co.'s Royster's Acid Phosphate.	Winston	12.75									10.20
9481	do	J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate.	Centerville	12.85									10.28
Brands claiming				13.00									10.40
9765	American Agricultural Chemical Co., New York, N. Y.	Zell's Acid Phosphate	Mocksville	13.08									10.46
9407	American Fertilizer Co., Norfolk, Va.	Eagle Brand Acid Phosphate	Charlotte	12.35									9.88

9480	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Bone and Potash Mixture.	Centerville.	10 27	4 02	13 66
9588	Powhatan Chemical Co., Richmond, Va.	Magie Bone and Potash Mixture.	Greensboro.	9 63	3 98	13 04
9676	Robertson Fertilizer Co., Norfolk, Va.	Skyscraper Bone and Potash Compound.	Liberty.	9 42	3 64	12 48
4517	Rowan Chemical Co., Salisbury, N. C.	Rowan Grain Mixture.		9 95	3 33	12 62
9474	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 10 and 4 Bone and Potash Mixture.	Kenersville.	10 02	4 54	14 01
9626	Southern Cotton Oil Co., Shelby, N. C.	Conqueror Bone and Potash.	Shelby.	9 85	5 02	14 39
9147	Swift Fertilizer Works, Wilmington, N. C.	Swift's Farmers' Home High Grade Phosphate and Potash.	Clarkton.	10 15	3 71	13 21
9573	do.	do.	Sauford.	9 43	4 57	13 51
9329	Union Guano Co., Winston, N. C.	Quaker Grain Mixture.	Hickory.	11 38	3 28	13 85
9337	do.	Union 10 and 4 Bone and Potash.	Clinton.	10 70	4 07	14 10
9476	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s S. W. Special Bone and Pot. Mix.	Centerville.	10 00	3 78	13 16
9305	do.	Old Dominion Guano Co.'s Obelisk Brand Bone and Pot.	Statesville.	9 75	3 92	13 09
9650	do.	Southern Chemical Co.'s Winter Grain Mixture.	Hendersonville.	8 90	3 79	12 16
8995	do.	V.-C. C. Co.'s Special Potash Mixture.	Mooreville.	10 07	2 93	12 28
Brands claiming						
9678	Armour Fertilizer Works, Wilmington, N. C.	Armour's Phosphoric Acid and Potash.	Biscoe.	10 52	4 14	14 02
9417	Columbia Guano Co., Norfolk, Va.	Columbia 10-5 Bone and Potash Mixture.	Greensboro.	10 30	4 79	14 51
9502	Contentnea Guano Co., Wilson, N. C.	Bone and Potash Mixture.	Four Oaks.	10 34	5 35	15 19
9688	Union Guano Co., Winston, N. C.	Union 10-5 Bone and Potash.	Winston.	9 67	4 75	13 93
8804	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s Alpine Mixture.	Raleigh.	11 57	4 16	14 99
9594	do.	Va. State Fert. Co.'s Mountain Top Bone and Potash.	Greensboro.	9 90	4 76	14 15
Brands claiming						
9687	Union Guano Co., Winston, N. C.	Liberty Bell Crop Grower.	Burlington.	10 48	1 40	10 99
9344	Va.-Car. Chemical Co., Richmond, Va.	Durham Fert. Co.'s Great Texas Wheat and Corn Grower.	Durham.	10 48	1 74	11 35
Brand claiming						
9515	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Horne & Sons' High Grade Bone and Potash.	Garner.	11 00	5 00	15 40
				10 97	4 66	15 00

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.							Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.		Potash from Sulphate.	Chlorine.
RAW OR UNMIXED FERTILIZER MATERIALS.												
Brands claiming				14.00								\$11.20
9779	Craven Chemical Co., New Bern, N. C.	Jewel Acid Phosphate.	Battleboro.	15.41								12.33
4651	do.	do.	Cove City.	14.18								11.34
4675	do.	do.	Vanceboro.	14.99								11.99
9462	Eastern Cotton Oil Co., Hertford, N. C.	Acid Phosphate.	Windsor.	14.35								11.48
8827	Farmers Guano Co., Richmond, Va.	14 Per Cent Acid Phosphate.	Mount Gilead.	14.99								11.99
9282	Harrell, S. B., & Co., Norfolk, Va.	Harrell's Acid Phosphate.	Edenton.	11.14								11.31
9038	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's 14 Per Cent Acid Phosphate.	Ayden.	15.72								12.58
8949	Imperial Co., Norfolk, Va.	Imperial High Grade Acid Phosphate.	Elizabeth City.	14.19								11.35
9796	MacMurphy Co., Charleston, S. C.	Acid Phosphate.	Wadesboro.	12.77								10.22
8828	Martin, D. B., Co., Richmond, Va.	Martin's Acid Phosphate.	Fayetteville.	14.49								11.59
9253	Martin & White, Baltimore, Md.	Martin & White's Acid Phosphate.	Elizabeth City.	15.04								12.03
9130	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Diamond Acid Phosphate.	Vanceboro.	14.48								11.58
9842	do.	do.	Fort Barnwell.	15.23								12.18
9843	do.	do.	Fort Barnwell.	14.99								11.99
9039	Mawborn, T. W., & Co., Kinston, N. C.	14 Per Cent Acid Phosphate.	Kinston.	14.80								11.84
9452	Miller Fertilizer Co., Baltimore, Md.	Acid Phosphate.	Windsor.	13.91								11.13

9091	do	do	High Point	13 41	10 73
8900	Navassa Guano Co., Wilmington, N. C.	Navassa Acid Phosphate, 14 Per Cent.	Lumberton	14 98	11 98
9131	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	14 Per Cent Acid Phosphate	Richlands	14 69	11 75
8981	Nitrate Agencies Co., New York, N. Y.	High Grade Acid Phosphate	Williamston	14 47	11 58
9192	do	do	Williamston	14 22	11 35
9359	Norfolk Fertilizer Co., Norfolk, Va.	Oriana 14 Per Cent Acid Phosphate	Lilesville	14 40	11 52
9703	Ober, G., & Sons Co., Baltimore, Md.	Ober's Dissolved Bone Phosphate	Jonesboro	14 12	11 30
9310	Pamlico Chemical Co., Washington, N. C.	Pamlico Bone Phosphate	Washington	14 57	11 66
9063	Patapsco Guano Co., Baltimore, Md.	Patapsco Pure Dissolved S. C. Phosphate	Henderson	14 42	11 54
9469	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Acid Phosphate	Ahoskie	14 85	11 88
9380	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' High Grade Acid Phosphate	Wadesboro	15 04	12 03
9689	Pocahontas Guano Co., Lynchburg, Va.	Imperial Dissolved S. C. Phosphate	Burlington	15 04	12 03
9284	Pocomoke Guano Co., Norfolk, Va.	Peerless Acid Phosphate	Elizabeth City	14 38	11 50
9747	Powhatan Chemical Co., Richmond, Va.	High Grade Acid Phosphate	Edward's Ferry	14 35	11 48
9362	Read Phosphate Co., Charleston, S. C.	Read's High Grade Acid Phosphate	Wadesboro	14 05	11 26
9026	Richmond Guano Co., Richmond, Va.	High Grade Acid Phosphate	Washington	14 44	11 31
9316	Robertson Fertilizer Co., Norfolk, Va.	Scepter Brand Acid Phosphate	Fairmont	14 70	11 76
9111	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate	Henderson	14 20	11 36
9845	do	do	Fort Barnwell	15 22	12 18
4679	do	Royster's F. S. R. 14 Per Cent Acid Phosphate	Fort Barnwell	14 50	11 60
4658	Southern Cotton Oil Co., Fayetteville, N. C.	S. C. O. Co.'s 14 Per Cent Acid Phosphate	Fayetteville	14 65	11 72
9628	Southern Cotton Oil Co., Shelby, N. C.	Gold Seal High Grade Acid Phosphate	Shelby	13 97	11 18
8961	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate	Lumberton	13 54	10 83
9145	Swift Fertilizer Works, Wilmington, N. C.	Swift's Cultivator High Grade Acid Phosphate	Clarkton	13 65	10 92
9580	Tidewater Guano Co., Norfolk, Va.	Bushier Brown Acid Phosphate	Nashville	12 92	10 34
9253	Tuscarora Fertilizer Co., Wilmington, N. C.	Tuscarora	Red Springs	13 88	11 10

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Percentage Composition of Parts per 100.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.	Relative Value per Ton at Factory.
RAW OR UNMIXED FERTILIZER MATERIALS.													
Brands claiming				14.00									\$11 20
8876	Union Alabattoir Co., Baltimore, Md.	Acid Phosphate.	Wadesboro.	14.46									11 57
8874	Union Guano Co., Winston, N. C.	Union High Grade Acid Phosphate.	Wadesboro.	14.79									11.83
9210	Cushur, R. L., Guano Co., Norfolk, Va.	High Grade Acid Phosphate.	Sherricks' Siding.	13.62									10 90
8878	Va.-Car. Chemical Co., Richmond, Va.	Norf. and Car. Chem. Co.'s Norfolk Reliable Acid Phosphate.	Wadesboro.	11.94									9 55
9555	do.	Powers, Gibbs & Co.'s Almont High Grade Acid Phosphate.	Pineville.	13.21									10 57
9396	do.	So. Chem. Co.'s Red Cross 14 Per Cent Acid Phosphate.	Statesville.	14.37									11 50
9847	do.	Va.-Car. Chem. Co.'s 14 Per Cent Acid Phosphate.	Fort Barnwell.	14.25									11 40
9491	do.	Va. State Fertilizer Co.'s Gilt Edge Brand.	Charlotte.	13.33									10 68
9328	do.	Valley of Virginia Phosphate.	Hickory.	13.84									11 07
9652	Winborne-Brown Guano Co., Norfolk, Va.	Standard Acid Phosphate.	Edenton.	13.58									10 86
Brand claiming				15.00									12 00
9651	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fert. Co.'s 15 Per Cent Acid Phosphate.	Tryon.	15.13									12 10
Brands claiming				16.00									12 80
9165	American Agricultural Chemical Co., New York, N. Y.	16 Per Cent Superphosphate.	Mackey's Ferry.	16.01									12 81
9028	American Fertilizer Co., Norfolk, Va.	American High Grade Acid Phosphate.	Charlotte.	14.78									11 82
9390	Armour Fertilizer Works, Wilmington, N. C.	Armour's Acid Phosphate.	Wilmington.	15.91									12 73

9334	do	Armour's 16 Per Cent Acid Phosphate.	Fayetteville	16 07	12 86
9395	do	do	Fayetteville	15 70	12 56
4468	Atlantic Chemical Co., Norfolk, Va.	Atlantic High Grade 16 Per Cent Acid Phosphate.	16 45	13 16	
4458	do	do	16 89	13 51	
8864	Baugh & Sons Co., Philadelphia, Pa.	Baugh's 16 Per Cent Acid Phosphate.	16 62	13 30	
4482	Baugh & Sons Co., Norfolk, Va.	Baugh's High Grade Acid Phosphate.	15 52	12 42	
9837	Berkley Chemical Co., Norfolk, Va.	Resolute Acid Phosphate	16 85	13 48	
9744	Boney, Paisley, Goldsboro, N. C.	16 Per Cent Acid Phosphate.	16 50	13 20	
9136	do	High Grade Acid Phosphate	16 70	13 36	
9525	Canton Fertilizer Co., Canton, Ga.	C. F. C. High Grade Dissolved Bone.	16 96	13 57	
8965	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	16 Per Cent Acid Phosphate.	16 45	13 16	
4459	Columbia Guano Co., Norfolk, Va.	Columbia High Grade Acid Phosphate.	16 63	13 30	
9414	do	Columbia High Grade 16 Per Cent Acid Phosphate.	16 72	13 38	
9726	Contentnea Guano Co., Wilson, N. C.	High Grade 16 Per Cent Acid Phosphate.	16 97	13 58	
9031	do	Special Formula Fertilizer	Mount Olive	12 54	
9144	Cooper Guano Co., Wilmington, N. C.	Cooper's 16 Per Cent Acid Phosphate.	16 22	12 98	
9780	Craven Chemical Co., New Bern, N. C.	Panama 16 Per Cent Acid Phosphate.	16 10	12 88	
9201	Crow Fertilizer Co., Monroe, N. C.	High Grade 16 Per Cent Acid Phosphate.	16 53	13 24	
9162	Eastern Cotton Oil Co., Hertford, N. C.	16 Per Cent Acid Phosphate.	16 04	12 83	
9352	Etiwan Fertilizer Co., Charleston, S. C.	Etiwan 16 Per Cent Acid Phosphate.	17 91	14 33	
9542	do	do	Rowland	13 78	
9809	Everett, John L., Rockingham, N. C.	16 Per Cent Acid Phosphate	16 52	13 22	
4553	do	do	Rockingham	16 10	
9090	Farmers Guano Co., Raleigh, N. C.	do	16 72	13 37	
9405	do	do	Marshallville	13 68	
9745	Farmers Supply Co., Edenton, N. C.	Acid Phosphate.	16 05	12 84	

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.							Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Phosphate.		Potash from Sulphate.	Chlorine.
RAW OR UNMIXED FERTILIZER MATERIALS.												
Brands claiming				16.00								\$12.80
9119	Fremont Oil Mill Co., Fremont, N. C.	Acid Phosphate.	Fremont	16.42								13.11
9377	Hampton Guano Co., Norfolk, Va.	Supreme Acid Phosphate	Lillington	16.34								13.07
9438	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's 16 Per Cent Acid Phosphate.	New Bern	16.45								13.16
9461	Imperial Guano Co., Norfolk, Va.	High Grade Tennessee Acid Phosphate.	Windsor	16.18								12.94
9541	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	Guaranteed Acid Phosphate	Tar Heel	16.00								12.80
9050	Martin, D. B., Co., Richmond, Va.	Martin's Acid Phosphate.	Goldshoro	16.46								13.17
9335	Martin & White Co., Baltimore, Md.	Martin & White's Acid Phosphate.	Elizabeth City	16.00								12.80
9080	Meadows, E. H. & J. A., Co., New Bern.	Meadows' Diamond Acid Phosphate.	Goldshoro	16.04								12.83
9040	Mexborn, T. W., & Co., Kingston, N. C.	16 Per Cent Acid Phosphate	Kingston	16.45								13.16
9219	Navassa Guano Co., Wilmington, N. C.	Navassa 16 Per Cent Acid Phosphate.	Rae-ford	16.67								13.34
8842	do	do.	Laurinburg	16.25								13.00
9828	do	do.	Fayetteville	14.97								11.98
9844	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	16 Per Cent Acid Phosphate	Fort Barnwell	16.84								13.47
3992	do	do.	Cove City	16.67								13.34
8910	Pamlico Chemical Co., Washington, N. C.	Pamlico 16 Per Cent Acid Phosphate.	Washington	16.33								13.06
9067	do	do.	Oriental	16.01								12.81

9218	Patapasco Guano Co., Baltimore, Md.	Florida Soluble Phosphate.	Sanford	16 27	13 02
9318	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont 16 Per Cent Acid Phosphate.	Edenton	16 15	12 92
9361	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' 16 Per Cent Acid Phosphate.	Wadesboro	16 74	13 39
4551	do	do	Rockingham	15 20	12 16
9711	Pocahontas Guano Co., Lynchburg, Va.	Carrington's S. C. Phosphate.	Rockwell	15 90	12 72
9453	Pocomoke Guano Co., Norfolk, Va.	Superb Acid Phosphate	Avoca	16 52	13 22
9209	do	do	Elizabeth City	15 54	12 43
9636	Powhatan Chemical Co., Richmond, Va.	Magic Dissolved Bone Phosphate.	Coats.	17 01	13 61
9825	do	do	Cox Log	16 76	13 41
9270	Rasin-Monumental Co., Baltimore, Md.	Rasin's 16 Per Cent Acid Phosphate.	Waxhaw	14 63	11 70
8990	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone	Shelby	16 00	12 80
9534	Robertson Fertilizer Co., Norfolk, Va.	High Peak Acid Phosphate.	Fairfield	15 94	12 75
9173	Rowan Chemical Co., Salisbury, N. C.	Rowan 16 Per Cent Acid Phosphate.	Salisbury	16 40	13 12
4465	Royster, F. S., Guano Co., Norfolk, Va.	High Grade 16 Per Cent Acid Phosphate.	Crisp	15 52	12 42
8991	do	Royster's High Grade 16 Per Cent Acid Phosphate.	Cherryville	15 82	12 66
4460	do	do	Park's Farm	16 79	13 43
9346	do	Royster's High Grade 16 Per Cent Acid Phosphate.	Fort Barnwell	15 91	12 73
4519	do	Royster's High Grade 16 Per Cent Acid Phosphate.	Bracebridge	16 76	13 41
8937	Southern Exchange Co., Maxton, N. C.	S. E. C. Acid Phosphate.	Wilmington	16 27	13 02
8999	Swift Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Mooreville	15 82	12 66
9990	Tuscarora Fertilizer Co., Wilmington, N. C.	Acid Phosphate.	Graham	15 54	12 43
9001	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand High Grade Acid Phosphate.	Mooreville	14 50	11 60
9172	do	Durham Fertilizer Co.'s Durham Best Acid Phosphate.	Norwood	16 70	13 36
8806	do	Southern Chem. Co.'s Comet 16 Per Cent Acid Phosphate.	Raleigh	16 01	12 81
9232	do	do	Lenoir	14 64	11 71
8923	do	Va.-Car. Chemical Co.'s 16 Per Cent Acid Phosphate.	Whiteville	16 35	13 05

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Name and Address of Manufacturer.				Name of Brand.	Where Sampled.	Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Potash from Muriate.	Potash from Sulphate.	Chlorine.	Relative Value per Ton at Factory.
RAW OR UNMIXED FERTILIZER MATERIALS.														
Brands claiming														
9829	Va.-Car. Chemical Co., Richmond, Va.				Va.-Car. Chemical Co.'s 16 Per Cent Acid Phosphate.	Fayetteville.	15.45							12.36
9811	do.				do.	Rockingham	16.57							13.26
9830	do.				do.	Fayetteville.	16.46							13.17
4637	do.				do.	Fayetteville.	16.97							13.58
9679	do.				do.	West End	16.28							13.02
9818	Vance Guano Co., Henderson, N. C.				Vance High Grade Acid Phosphate.	Henderson	17.27							13.82
9759	Venable Fertilizer Co., Richmond, Va.				Venable's Best Acid Phosphate.	Elm City	15.92							12.74
9211	Winborne-Brown Guano Co., Norfolk, Va.				High Grade Acid Phosphate.	Waddell.	16.00							12.80
9567	Young, J. R., Fertilizer Co., Norfolk, Va.				High Grade 16 Per Cent Acid Phosphate.	Edenton	16.00							12.80
Brands claiming														
8825	Acme Mfg. Co., Wilmington, N. C.				Pure German Kainit	Fayetteville				12.00				12.00
9286	American Agricultural Chemical Co., New York, N. Y.				Genuine German Kainit	Edenton				12.86				12.86
8993	American Fertilizer Co., Norfolk, Va.				do.	Sluoby				12.08				12.08
8953	Baugh & Sons Co., Baltimore, Md.				do.	Elizabeth City				13.10				13.10
9266	Berkley Chemical Co., Norfolk, Va.				do.	Waxhaw				10.08				10.08
9048	Best, M. J., & Sons, Goldsboro, N. C.				Pure German Kainit	Goldsboro				12.56				12.56
										12.92				12.92

9446	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Genuine German Kainit	Richmond	11 96	11 96
9255	Cartier, J. W., Maxton, N. C.	German Kainit	Maxton	12 76	12 76
9065	Coe-Mortimer Co., Charleston, S. C.	do	Simpson	12 12	12 12
9428	Columbia Guano Co., Norfolk, Va.	Genuine German Kainit	Belmont	12 40	12 40
9256	Conestee Chemical Co., Wilmington, N. C.	do	Maxton	12 72	12 72
4682	Craven Chemical Co., New Bern, N. C.	do	Cove City	12 28	12 28
9849	do	do	Fort Barnwell	12 36	12 36
8782	do	do	Battleboro	12 32	12 32
9079	German Kali Works, Baltimore, Md.	German Kainit	Faison	12 94	12 94
8840	do	do	Rockingham	12 70	12 70
4554	do	do	Rockingham	13 28	13 28
4555	do	do	Fayetteville	12 92	12 92
9503	do	do	Rockingham	12 36	12 36
9504	do	do	Rockingham	12 28	12 28
9041	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Pure German Kainit	Ayden	14 40	14 40
9463	Imperial Guano Co., Norfolk, Va.	Genuine German Kainit	Windsor	13 32	13 32
8841	John, J. T., John's Station, N. C.	do	Laurinburg	13 00	13 00
8877	Leak & Marshall, Wadesboro, N. C.	Pure German Kainit	Wadesboro	13 16	13 16
9388	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	Genuine German Kainit	Lumberton	12 80	12 80
9409	Marsh-Lee & Co., Marshville, N. C.	do	Marshville	13 14	13 14
4523	Martin, D. B., Co., Richmond, Va.	Martin's Bull Head German Kainit	Tarboro	13 60	13 60
9536	Martin & White Co., Baltimore, Md.	Genuine German Kainit	Elizabeth City	13 40	13 40
9397	McNair, John F., Laurinburg, N. C.	do	Fayetteville	12 88	12 88
9220	do	do	Racford	12 76	12 76
9250	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' German Kainit	Fort Barnwell	13 40	13 40
9078	do	do	Goldsboro	15 80	15 80

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.						
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Potash from Sulphate.	Chlorine.
RAW OR UNMIXED FERTILIZER MATERIALS.										
Brands claiming										
9360	Mewborn, T. W., & Co., Kinston, N. C.	Genuine German Kainit	Kinston				12.00			\$12.00
9469	Miller Fertilizer Co., Baltimore, Md.	German Kainit	Wake Forest				13.38			13.38
8998	Navassa Guano Co., Wilmington, N. C.	Genuine German Kainit	Cornelius				13.48			13.48
9862	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	do	Deep Run				12.56			12.56
9437	do	do	Maysville				12.28			12.28
9320	Nitrate Agency Co., Norfolk, Va.	German Kainit	Edenton				12.84			12.84
9321	Pamlico Chemical Co., Washington, N. C.	Genuine German Kainit	Washington				15.90			15.90
9363	Parsons & Hardison, Wadesboro, N. C.	do	Wadesboro				13.04			13.04
9062	Patapasco Guano Co., Baltimore, Md.	do	Henderson				12.36			12.36
9184	Pearsall & Co., Wilmington, N. C.	do	Mount Tabor				12.00			12.00
9164	Piedmont-Mount Airy Guano Co., Baltimore, Md.	do	Ahoskie				13.08			13.08
9516	Pine Level Oil Mill Co., Pine Level, N. C.	Pine Level Kainit	Garner				13.72			13.72
4528	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' German Kainit	Washington				13.48			13.48
9871	do	do	Matthews				12.48			12.48
9183	Pocomoke Guano Co., Norfolk, Va.	Genuine German Kainit	Fairmont				12.61			12.61
9869	Robertson Fertilizer Co., Norfolk, Va.	do	Littleton				12.40			12.40
							12.61			12.61

9042	Royster, F. S., Guano Co., Norfolk, Va., Genuine F. S. R. German Kainit	Kinston	13 00	13 00
9851	do	Fort Barnwell	12 56	12 55
9559	Richmond Guano Co., Richmond, Va., Pure German Kainit	Spring Hope	12 92	12 92
8934	Southern Exchange Co., Maxton, N. C., Genuine German Kainit	Wilmington	12 58	12 58
9268	Swift Fertilizer Works, Atlanta, Ga., Swift's Pure German Kainit	Waxhaw	12 52	12 52
9387	Tuscarora Fertilizer Works, Wilmington, N. C., German Kainit	Wilmington	16 48	16 48
8878	Union Abattoir Co., Norfolk, Va., Union Abattoir Genuine German Kainit	Wadesboro	11 64	11 64
9408	Union Guano Co., Winston, N. C., Genuine German Kainit	Matthews	12 72	12 72
8922	Va.-Car. Chemical Co., Richmond, Va., do	Whiteville	11 94	11 94
9848	do	Fort Barnwell	13 24	13 24
9285	Winborne-Brown Guano Co., Norfolk, Va., do	Edenton	13 36	13 36
Brand claiming				
9801	Powhatan Chemical Co., Richmond, Va., High Grade German Potash	House	16 00	16 00
Brands claiming				
4524	Royster, F. S., Guano Co., Norfolk, Va., Manure Salt	Shiloh	15 76	15 76
4518	do	Bracebridge	20 00	20 00
Brands claiming				
9772	Acme Mfg. Co., Wilmington, N. C., Muriate of Potash	Lumberton	19 44	19 44
9398	Armoir Fertilizer Works, Wilmington, N. C., do	Fayetteville	20 68	20 68
9389	do	Fayetteville	48 00	48 00
8887	Baugh & Sons Co., Philadelphia, Pa., do	Elizabeth City	49 24	49 24
8974	Carter, J. W., Maxton, N. C., do	Maxton	48 84	48 84
9730	Columbia Guano Co., Norfolk, Va., do	Clinton	50 64	50 64
8964	German Kali Works, Baltimore, Md., Sulphate of Potash	Wilson	51 04	51 04
9148	Navassa Guano Co., Wilmington, N. C., Muriate of Potash	Clarkton	49 74	49 74
9631	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C., do	Kinston	49 76	49 76
			49 28	49 28
			50 68	50 68
			49 52	49 52

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.							Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Murate.		Potash from Sulphate.	Chlorine.
RAW OR UNMIXED FERTILIZER MATERIALS.												
Brands claiming												
9194	Nitrate Agencies Co., New York, N. Y.	Sulphate of Potash.	Williamston						48 00			\$48 00
9317	Robertson Fertilizer Co., Norfolk, Va.	do.	Fairmont						48 81			48 81
4611	Southern Cotton Oil Co., Goldsboro, N. C.	Muriate of Potash	Enfield						51 16			51 16
9254	Tuscarora Fertilizer Co., Wilmington, N. C.	do.	Red Springs						50 44			50 44
9049	Va.-Car. Chemical Co., Richmond, Va.	do.	Goldsboro						49 88			49 88
Brands claiming												
9457	American Agricultural Chemical Co., New York, N. Y.	Muriate of Potash	Windsor						49 28			49 28
9389	American Fertilizer Co., Norfolk, Va.	do.	Lumberton						51 00			51 00
9265	Berkley Chemical Co., Norfolk, Va.	do.	Waxhaw						49 00			49 00
9007	Bryant Fertilizer Co., Alexandria, Va.	do.	Angier						46 90			46 90
9096	Coe-Mortimer Co., Charleston, S. C.	do.	Simpson						48 52			48 52
9269	Pocomoke Guano Co., Norfolk, Va.	do.	Waxhaw						49 72			49 72
8935	Southern Exchange Co., Maxton, N. C.	do.	Williamston						50 03			50 03
9338	Union Guano Co., Winston, N. C.	do.	Clinton						48 92			48 92
4635	Va.-Car. Chemical Co., Richmond, Va.	do.	Fayetteville						42 20			42 20
9182	do.	do.	Fairmont						47 68			47 68

9331	do	do	Fayetteville	48 48	48 48
Brands claiming					
9447	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Sulphate of Potash	Raleigh	49 00	49 00
9180	Cooper, W. B., Wilmington, N. C.	Muriate of Potash	Fairmont	50 48	50 48
9181	do	do	Fairmont	49 32	49 32
9899	German Kali Works, Baltimore, Md.	do	Laurinburg	50 10	50 10
9319	do	Sulphate of Potash	Edenton	49 44	49 44
4607	do	Muriate of Potash	Palmyra	49 36	49 36
9503	do	do	Rockingham	50 44	50 44
9505	do	do	Rockingham	52 12	52 12
9812	do	do	Rockingham	50 08	50 08
9861	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Sulphate of Potash	Kinston	47 16	47 16
9892	Nitrate Agences Co., New York, N. Y.	Muriate of Potash	Williamston	50 27	50 27
9183	do	do	Williamston	46 13	46 13
9781	do	do	Enfield	49 84	49 84
9773	Swift Fertilizer Works, Wilmington, N. C.	Swift's Muriate of Potash	Lumber Bridge	49 84	49 84
9585	Upshur, R. L., Guano Co., Norfolk, Va.	Muriate of Potash	Winston	51 92	51 92
Brand claiming					
9312	Pamlico Chemical Co., Washington, N. C.	Sulphate of Potash	Washington	55 00	55 00
Brands claiming					
9713	Browley, E. W., Mooresville, N. C.	Dried Blood	Mooresville	49 13	49 13
9098	Coe-Mortimer Co., Charleston, S. C.	do	Simpson	13 16 16 00	51 32
9830	Meadows, E. H. & J. A., Co., New Bern, N. C.	do	Kinston	13 05 15 88	50 93
Brand claiming					
9391	Coe-Mortimer Co., Charleston, S. C.	Dried Blood	Wilmington	13 10 15 93	51 09
				12 69 15 32	49 14
				13 37 16 25	52 14
				13 08 15 90	51 01

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Percentage Composition of Parts per 100.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Available Phosphoric Acid.					Total Nitrogen.	Equivalent to Ammonia.	Potash from Muriate.	Potash from Sulphate.	Chlorine.	Relative Value per Ton at Factory.	
				Water-soluble Nitrogen.	Organic Nitrogen.										
RAW OR UNMIXED FERTILIZER MATERIALS.															
Brand claiming															
9892	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Dried Blood	Greenville						13 98	17 00				\$54 52	
Brands claiming															
9311	Pamlico Chemical Co., Washington, N. C.	Pamlico Ground Fish	Washington						8 10	9 85				31 59	
99015	Va.-Car. Chemical Co., Richmond, Va.	Fish Scrap	Wallace						8 84	10 75				31 48	
1605	do	do	Palmyra						9 04	10 99				35 26	
Brand claiming															
8830	Parsons & Hardison, Wadesboro, N. C.	High Grade Ground Tankage	Mount Gilgoad						9 05	11 00				35 30	
Brands claiming															
8962	American Fertilizer Co., Norfolk, Va.	Nitrate of Soda	Lumberton						14 80	18 00				57 72	
9185	Cooper, W. B., Wilmington, N. C.	do	Fairmont						15 23	18 52				59 40	
9783	Craven Chemical Co., New Bern, N. C.	do	Battleboro						15 40	18 72				60 06	
9810	Grace, W. R., & Co., New York, N. Y.	do	Rockingham						15 26	18 55				59 51	
4475	do	do	Lumber Bridge						14 94	18 16				58 27	
9396	do	do	Fayetteville						15 60	18 97				60 84	
9138	do	do	Rae-ford						15 52	18 87				60 53	
9598	do	do	Rockingham						15 40	18 72				60 06	
									15 36	18 67				59 99	

9509	do	do	Rockingham	15 30 18 60	59 67
8829	do	do	Fayetteville	15 20 18 48	59 28
9287	do	do	Edenton	15 00 18 24	58 50
9444	Navassa Guano Co., Wilmington, N. C.	do	Lucama	15 10 18 36	58 89
8936	N. C. Cotton Oil Co., Wilmington, N. C.	do	Wilmington	15 22 18 50	59 36
9817	Nitrate Agencies, Norfolk, Va.	do	Littleton	15 43 18 76	60 18
9784	do	do	Enfield	15 43 18 76	60 18
9748	do	do	Edenton	15 23 18 52	59 39
9838	Panlico Chemical Co., Washington, N. C.	do	Washington	15 43 18 76	60 18
8865	Peruvian Guano Corporation, Charleston, S. C.	do	Edenton	15 27 18 57	59 55
9252	Southern Cotton Oil Co., Gibson, N. C.	do	Red Springs	14 77 17 96	57 60
4606	do	do	Enfield	15 37 18 69	59 94
4685	Swift Fertilizer Works, Atlanta, Ga.	do	Fayetteville	15 13 18 40	59 01
9775	do	do	Lumber Bridge	15 46 18 80	60 29
4642	do	do	Fayetteville	14 97 18 20	58 38
9251	Tuscarora Fertilizer Co., Wilmington, N. C.	do	Red Springs	15 14 18 41	59 05
9581	Union Guano Co., Winston, N. C.	do	Nashville	15 56 18 92	60 68
9778	United States Guano Co., Baltimore, Md.	do	Elm City	15 36 18 67	59 90
4626	Va.-Car. Chemical Co., Richmond, Va.	do	Lucama	15 40 18 72	60 06
4632	do	do	Lucama	15 10 18 36	58 89
8963	do	do	Fayetteville	15 04 18 29	58 06
4629	do	do	Lucama	14 87 18 08	57 99
4474	do	do	Red Springs	14 14 17 19	55 15
4639	do	do	Fayetteville	13 92 16 93	54 29
8879	Wessell, Duval & Co., New York, N. Y.	do	Wadesboro	15 25 18 54	59 47

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition of Parts per 100.										Relative Value per Ton at Factory.	
				Available Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Muriate.	Potash from Sulphate.	Chlorine.			
RAW OR UNMIXED FERTILIZER MATERIALS.															
Brands claiming															
9097	Coe-Mortimer Co., Charleston, S. C.	Nitrate of Soda	Simpson				15 07	18 32							58 77
9240	Pocomoke Guano Co., Norfolk, Va.	do	Clarkton				15 23	18 52							59 40
9146	Southern Exchange Co., Maxton, N. C.	do	Wilmington				15 04	18 29							58 66
Brands claiming															
8869	Baugh & Sons Co., Norfolk, Va.	Nitrate of Soda	Elizabeth City				15 40	18 72							59 60
9487	Columbia Guano Co., Norfolk, Va.	do	Seemora				15 53	18 88							60 57
9615	Robertson Fertilizer Co., Norfolk, Va.	do	Fairmont				15 63	19 00							60 96
4462	Royster, F. S., Guano Co., Norfolk, Va.	do	Tarboro				14 94	18 16							58 27
9275	do	do	Rougemont				14 71	17 88							57 37
Brands claiming															
9415	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Nitrate of Soda	Raleigh				15 10	18 36							58 89
9200	Clayton Oil Mill, Clayton, N. C.	do	Clayton				15 63	19 00							60 96
9120	Richmond Guano Co., Richmond, Va.	do	Pine Level				15 37	18 69							59 94
9212	Winborne-Brown Guano Co., Norfolk, Va.	do	Waddell				15 30	18 60							59 87

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1911.

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Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	Percentage Composition or Parts per 100.										Relative Value per Ton at Factory.
				*Total Phosphoric Acid.	Water-soluble Nitrogen.	Organic Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Murate.	Potash from Sulphate.	Chlorine.		
RAW OR UNMIXED FERTILIZER MATERIALS.														
	Brand claiming			20 00			3 70	4 50						\$28 43
9722	Pocomoke Guano Co., Norfolk, Va.	Pure Ground Bone	Sylva	23 85			3 75	4 60						31 44
	Brands claiming			22 50			3 70	4 50						30 16
9488	American Fertilizer Co., Norfolk, Va.	Raw Bone Meal	Reidsville	20 75			3 90	4 81						29 97
9087	Baugh & Sons Co., Norfolk, Va.	do	High Point	19 93			3 98	4 84						29 47
8795	Va.-Car Chemical Co., Richmond, Va.	do	Raleigh	20 88			3 86	4 69						30 83
	Brand claiming			22 50			2 47	3 00						25 38
9088	Miller Fertilizer Co., Baltimore, Md.	Ground Bone	High Point	23 20			2 86	3 48						27 39
	Brand claiming			6 20			5 60	6 81						28 18
9099	Coe-Mortimer Co., Charleston, S. C.	Fish Guano	Simpson	6 95			5 78	7 03						27 41
	Brand claiming			11 00			5 76	7 00	2 50					34 64
4307	Peruvian Guano Corporation, Charleston, S. C.	High Grade Genuine Peruvian Guano.	Washington	11 23			5 30	6 44	2 63					32 41
	Brand claiming			11 00			6 79	8 28	2 75					39 24
9277	Peruvian Guano Corporation, Charleston, S. C.	High Grade Genuine Peruvian Guano.	Aloskie	11 63			6 94	8 44	2 53					40 07
	Brand claiming			12 00			2 88	3 50	2 00					22 70
9020	Peruvian Guano Corporation, Charleston, S. C.	High Grade Genuine Peruvian Guano.	Washington	11 30			3 54	4 30	2 01					24 99

Percentage Composition of Parts per 100.

Laboratory Number.	Name and Address of Manufacturer.	Name of Brand.	Where Sampled.	*Total Phosphoric Acid.	Water-Soluble Nitrogen.	Crystalline Nitrogen.	Total Nitrogen.	Equivalent to Ammonia.	Total Potash.	Potash from Murate.	Potash from Sulphate.	(Indirect Relative Value per Ton at Factory.)
RAW OR UNMIXED FERTILIZER MATERIALS.												
Brand claiming				13.00			4.83	5.87	2.00			\$31.59
9296	Peruvian Guano Corporation, Charleston, S. C.	High Grade Genuine Peruvian Guano.	Morven	15.68			4.84	5.88	1.57			27.15
Brands claiming				18.00			3.08	3.75	2.40			28.18
8863	Peruvian Guano Corporation, Charleston, S. C.	Genuine Peruvian Guano	Edenton	17.25			3.38	4.11	2.62			29.15
4495	do	do	Newton Grove	18.08			3.24	3.94	2.30			28.79
4441	do	do	Kenly	18.40			3.06	3.72	2.40			28.37
4488	do	do	Mount Olive	18.18			3.16	3.84	2.06			28.26
4490	do	do	Lillington	17.78			3.04	3.70	2.32			27.77
4527	do	do	Jonesboro	17.00			3.16	3.84	2.11			27.49
Brand claiming				5.03			7.61	9.25				33.18
9614	Coe-Mortimer Co., Charleston, S. C.	High Grade Tankage	Mount Tabor	4.35			7.56	9.19				32.52
Brand claiming				17.00								11.90
9334	Coe-Mortimer Co., Charleston, S. C.	Thomas Phosphate	Clinton	16.65								11.65
Brands claiming				17.50								12.25
9868	Coe-Mortimer Co., Charleston, S. C.	Thomas Phosphate	Bullock	17.50								12.25
9200	do	do	Wadesboro	17.23								12.06

*Total Phosphoric Acid in Bone Meal, Peruvian Guano and Thomas Phosphate valued at 31 cents per pound.

II. ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Nitrogen Guaranteed.	Equivalent to Ammonia.	Per Cent Nitrogen Found.	Equivalent to Ammonia.
4361	Arey Oil and Fertilizer Co., Salisbury, N. C.	Hickory	6.17	7.50	6.46	7.85
4474	do.	Mocksville	6.17	7.50	6.38	7.76
4533	do.	Goldsboro	6.17	7.50	6.24	7.59
4487	do.	Mount Ulla	6.17	7.50	6.18	7.51
4359	Baldwin, Prince & Co., Norfolk, Va.	Elizabeth City	6.17	7.50	6.08	7.39
4300	Battleboro Oil Co., Battleboro, N. C.	Battleboro	6.17	7.50	6.36	7.73
4270	do.	do.	6.17	7.50	6.34	7.71
4454	do.	do.	6.17	7.50	6.06	7.37
4337	do.	do.	6.17	7.50	5.98	7.27
4272	do.	do.	6.17	7.50	5.56	6.76
4292	Bragaw Fertilizer Co., Washington, N. C.	Washington	6.17	7.50	6.26	7.60
4426	Bridgers, H. E., & Co., Memphis, Tenn.	Fayetteville	6.58	8.00	6.52	7.93
4329	do.	do.	6.17	7.50	6.32	7.68
4328	do.	Wallace	6.17	7.50	6.30	7.66
4534	Brode, F. W., & Co., Memphis, Tenn.	Edenton	6.17	7.50	6.66	8.10
4561	do.	Bryson City	6.17	7.50	6.54	7.95
4397	do.	Magnolia	6.17	7.50	6.52	7.93
4309	do.	Hobgood	6.17	7.50	6.02	7.32
4462	Buckeye Cotton Oil Co., Charlotte, N. C.	Rockingham	6.17	7.50	6.66	8.10
4467	do.	do.	6.17	7.50	6.46	7.85
4441	do.	LaGrange	6.17	7.50	6.40	7.78
4427	do.	Rockingham	6.17	7.50	6.38	7.76
4470	do.	do.	6.17	7.50	6.38	7.76
4483	do.	do.	6.17	7.50	6.28	7.64
4425	do.	do.	6.17	7.50	6.22	7.56
4472	do.	do.	6.17	7.50	6.16	7.49
4471	do.	do.	6.17	7.50	6.12	7.44
4221	Central Oil and Fertilizer Co., Cordele, Ga.	Andrews	6.17	7.50	6.50	7.90
4435	Chatham Oil Co., Pittsboro, N. C.	Siler City	6.17	7.50	6.66	8.10
4434	do.	Pittsboro	6.17	7.50	6.44	7.83
4385	do.	Manson	6.17	7.50	6.14	7.47
4468	do.	Rockingham	6.17	7.50	6.12	7.44
4244	Clayton Oil Mills, Clayton, N. C.	Clayton	6.17	7.50	6.52	7.93
4225	do.	do.	6.17	7.50	6.36	7.73
4381	do.	do.	6.17	7.50	6.18	7.51
4401	Clover Cotton Oil and Ginning Co., Clover, S. C.	Hardin	6.17	7.50	6.24	7.59

ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Nitrogen Guaranteed.	Equivalent to Ammonia.	Per Cent Nitrogen Found.	Equivalent to Ammonia.
4506	Consumers Cotton Oil Co., Tarboro, N. C.	Crisp	6.17	7.50	6.40	7.78
4504	do	Tarboro	6.17	7.50	6.40	7.78
4379	do	Elizabeth City	6.17	7.50	6.30	7.66
4377	do	Pinetop	6.17	7.50	6.26	7.61
4517	do	Norfleet	6.17	7.50	6.10	7.42
4293	Cotton Oil and Ginning Co., Lumberton, N. C.	Lumberton	6.17	7.50	6.22	7.56
4530	Cotton Oil and Ginning Co., Scotland Neck, N. C.	Palmyra	6.17	7.50	6.02	7.32
4436	DeSoto Oil Co., Memphis, Tenn.	Wilmington	6.17	7.50	6.40	7.78
4443	do	Hendersonville	6.17	7.50	6.36	7.73
4312	Donalsonville Oil Mill, Donalsonville, Ga.	Wallace	6.17	7.50	6.18	7.51
4313	Dunn Oil Mills Co., Dunn, N. C.	Clinton	6.17	7.50	6.64	8.07
4375	do	Kenly	6.17	7.50	6.44	7.83
4219	do	do	6.17	7.50	6.34	7.71
4281	Eastern Cotton Oil Mills, Hertford, N. C.	Hertford	6.17	7.50	6.32	7.68
4290	do	Edenton	6.17	7.50	6.30	7.66
4229	do	Elizabeth City	6.17	7.50	5.96	7.25
4363	do	Harrellsville	6.17	7.50	5.92	7.20
4431	Elba Mfg. Co., Charlotte, N. C.	Charlotte	6.17	7.50	6.66	8.10
4478	do	Rowland	6.17	7.50	6.52	7.93
4461	do	Rockingham	6.17	7.50	6.48	7.88
4433	do	Apex	6.17	7.50	6.44	7.83
4372	do	Hot Springs	6.17	7.50	6.38	7.76
4213	do	Greensboro	6.17	7.50	6.32	7.68
4320	do	Maxton	6.17	7.50	5.96	7.25
4220	do	Waynesville	6.17	7.50	6.12	7.44
4299	Farmers Cotton Oil Co., Wilson, N. C.	Edenton	6.17	7.50	6.58	8.00
4318	do	Clinton	6.17	7.50	6.36	7.73
4224	do	Wilson	6.17	7.50	5.72	6.95
4373	Farmers Cotton Oil and Fertilizer Co., Hunts- ville, Ala.	Asheville	6.17	6.50	6.56	7.98
4364	do	Morganton	6.17	7.50	6.54	7.95
4501	Farmville Oil and Fertilizer Co., Farmville, N.C.	Winterville	6.17	7.50	6.26	7.61
4368	do	Grimesland	6.17	7.50	6.08	7.39
4369	Fremont Oil Mill Co., Fremont, N. C.	Fremont	6.17	7.50	6.04	7.34
4562	Georgia Cotton Oil Co., Atlanta, Ga.	Bushnell	6.17	7.50	6.30	7.66
4445	do	Bryson City	6.17	7.50	5.94	7.22
4289	Havens Oil Co., Washington, N. C.	Oriental	6.17	7.50	6.52	7.93

ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Nitrogen Guaranteed.		Equivalent to Ammonia.	
			Per Cent Nitrogen Found.	Equivalent to Ammonia.		
4414	Havens Oil Co., Washington, N. C.	Belhaven	6.17	7.50	6.40	7.78
4322	do.	Robersonville	6.17	7.50	6.30	7.66
4402	do.	Washington	6.17	7.50	6.26	7.61
4217	do.	Stonewall	6.17	7.50	6.06	7.37
4307	Humphreys, Goodwin & Co., Memphis, Tenn.	Washington	6.17	7.50	6.34	7.71
4466	do.	do.	6.17	7.50	6.18	7.51
4371	Imperial Cotton Oil Co., Statesville, N. C.	Marion	6.17	7.50	6.56	7.98
4476	do.	do.	6.17	7.50	6.54	7.95
4528	do.	Matthews	6.17	7.50	6.48	7.88
4523	do.	Wilkesboro	6.17	7.50	6.34	7.71
4211	Kings Mountain Cotton Oil Co., Kings Mountain, N. C.	Kings Mountain	6.17	7.50	7.20	8.75
4208	Lancaster Cotton Oil Co., Lancaster, S. C.	Gilkey	6.17	7.50	5.54	6.74
4540	Laurinburg Oil Co., Laurinburg, N. C.	Laurinburg	6.17	7.50	6.36	7.73
4432	Lee County Cotton Oil Co., Sanford, N. C.	Sanford	6.17	7.50	5.80	7.05
4291	Lenoir Oil and Ice Co., Kinston, N. C.	Kinston	6.17	7.50	7.14	8.63
4230	do.	do.	6.17	7.50	6.12	7.44
4518	do.	Dover	6.17	7.50	6.10	7.42
4316	Louisburg Cotton Oil Co., Louisburg, N. C.	Durham	6.17	7.50	6.34	7.71
4526	do.	Littleton	6.17	7.50	6.22	7.56
4429	Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.	St. Pauls	6.17	7.50	5.90	7.17
4430	do.	do.	6.17	7.50	6.02	7.32
4428	do.	do.	6.17	7.50	5.84	7.10
4460	Meadows, E. H. & J. A., Co., New Bern, N. C.	Trenton	6.17	7.50	6.32	7.63
4209	Milledgeville Oil Mills, Milledgeville, Ga.	Raleigh	6.17	7.50	5.96	7.25
4263	Mooreville Oil Mill, Mooreville, N. C.	Mooreville	6.17	7.50	6.62	8.05
4477	do.	Swannanoa	6.17	7.50	6.58	8.00
4522	do.	Elkins	6.17	7.50	6.36	7.73
4447	Morgan Oil and Fertilizer Co., Red Springs, N. C.	Red Springs	6.17	7.50	6.10	7.42
4405	Mount Gilead Cotton Oil Co., Mount Gilead, N. C.	Mount Gilead	6.17	7.50	6.78	8.24
4251	do.	do.	6.17	7.50	6.78	8.24
4282	do.	do.	6.17	7.50	6.60	8.02
4303	do.	do.	6.17	7.50	6.58	8.00
4283	do.	do.	6.17	7.50	6.44	7.83
4285	do.	do.	6.17	7.50	6.30	7.66
4348	do.	do.	6.17	7.50	6.18	7.50
4545	do.	do.	6.17	7.50	5.48	6.63

ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent	Equivalent to	Per Cent	Equivalent to
			Nitrogen Guaranteed.	Ammonia.	Nitrogen Found.	Ammonia.
4531	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Fort Barnwell	6.17	7.50	6.44	7.83
4519	do.	Dover	6.17	7.50	6.36	7.73
4521	do.	Fort Barnwell	6.17	7.50	6.32	7.68
4448	do.	Edenton	6.17	7.50	6.22	7.53
4457	do.	Pamlico	6.17	7.50	6.10	7.42
4542	do.	Cove City	6.17	7.50	6.10	7.42
4255	do.	Alliance	6.17	7.50	6.10	7.42
4295	do.	Vanceboro.	6.17	7.50	6.06	7.37
4357	do.	Richlands	6.17	7.50	6.02	7.32
4524	do.	Jacksonville	6.17	7.50	6.02	7.32
4223	do.	New Bern	6.17	7.50	5.96	7.25
4406	do.	Pollocksville	6.17	7.50	5.78	7.03
4376	Nitrate Agencies, New York, N. Y.	Williamston	6.17	7.50	6.06	7.37
4482	North Carolina Cotton Oil Co., Charlotte, N. C.	Rockingham	6.17	7.50	6.04	7.34
4319	do.	Maxton	6.17	7.50	5.84	7.10
4314	do.	Marshville	6.17	7.50	5.78	7.03
4473	do.	Rockingham	6.17	7.50	6.68	8.12
4353	do. Henderson, N. C.	Bullocks	6.17	7.50	5.86	7.12
4393	do.	Youngsville	6.17	7.50	5.60	6.81
4525	do.	Littleton	6.17	7.50	5.60	6.81
4572	do.	Coats	6.17	7.50	5.56	6.76
4437	do.	Apex	6.17	7.50	5.58	6.78
4315	do.	Durham	6.17	7.50	5.54	6.74
4571	do.	Coats	6.17	7.50	5.48	6.66
4438	do. Raleigh, N. C.	Apex	6.17	7.50	5.98	7.27
4453	do.	Cary	6.17	7.50	5.80	7.05
4527	do.	Macon	6.17	7.50	5.78	7.03
4465	do. Wilmington, N. C.	Fayetteville	6.17	7.50	6.36	7.73
4294	do.	Chadbourn	6.17	7.50	6.36	7.73
4560	do.	Fayetteville	6.17	7.50	6.16	7.49
4216	do.	Burgaw	6.17	7.50	5.96	7.25
4358	do.	Ahoskie	6.17	7.50	5.96	7.25
4378	do.	Benson	6.17	7.50	5.82	7.08
4469	Phoenix Cotton Oil Co., Memphis, Tenn.	Whitakers	6.17	7.50	6.34	7.71
4479	do.	Rowland	6.17	7.50	6.26	7.61
4444	Pine Level Oil Mill Co., Pine Level, N. C.	Cary	6.17	7.50	6.78	8.24

ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Nitrogen Guaranteed.	Equivalent to Ammonia.	Per Cent Nitrogen Found.	Equivalent to Ammonia.
4382	Pine Level Oil Mill Co., Pine Level, N. C.	Pine Level.....	6.17	7.50	6.21	7.59
4210	do.	do.	6.17	7.50	6.20	7.54
4255	do.	do.	6.17	7.50	6.22	7.56
4271	do.	do.	6.17	7.50	6.10	7.42
4218	do.	Benson.....	6.17	7.50	6.00	7.29
4247	do.	Pine Level.....	6.17	7.50	5.92	7.20
4180	Pitt County Oil Mill Co., Winterville, N. C.	Winterville.....	6.17	7.50	6.34	7.71
4537	Planters Cotton-seed Oil Co., Rocky Mount, N. C.	Rocky Mount...	6.17	7.50	6.40	7.78
4214	do.	do.	6.17	7.50	6.00	7.29
4502	Powhatan Chemical Co., Richmond, Va.	Edenton.....	6.17	7.50	6.74	8.19
4380	Rowland Oil and Fertilizer Co., Rowland, N. C.	do.	6.17	7.50	6.16	7.49
4449	Saluda Oil Mill, Piedmont, S. C.	Mayesville.....	6.17	7.50	6.18	7.51
4442	Smith, W. Newton, Baltimore, Md.	LaGrange.....	6.17	7.50	6.28	7.64
4311	do.	Bethel.....	6.17	7.50	6.18	7.51
4459	Southern Cotton Oil Co., Atlanta, Ga.	Rockingham.....	6.17	7.50	6.24	7.59
4362	do. Charlotte, N. C.	Morganton.....	6.17	7.50	6.12	7.44
4321	do.	Maxton.....	6.17	7.50	6.10	7.42
4383	do.	Sanford.....	6.17	7.50	6.02	7.32
4222	do.	Elkin.....	6.17	7.50	5.72	6.95
4455	do. Columbia, S. C.	Morven.....	6.17	7.50	6.08	7.39
4231	do. Conetoe, N. C.	Greenville.....	6.17	7.50	6.50	7.90
4367	do.	do.	6.17	7.50	6.10	7.42
4310	do.	Conetoe.....	6.17	7.50	5.98	7.27
4297	do. Davidson, N. C.	Raleigh.....	6.17	7.50	6.28	7.64
4488	do. Dublin, Ga.	Clinton.....	6.17	7.50	6.00	7.29
4392	do. Fayetteville, N. C.	Fayetteville.....	6.17	7.50	7.20	8.75
4464	do.	do.	6.17	7.50	6.46	7.83
4355	do.	Raeford.....	6.17	7.50	6.12	7.44
4317	do.	do.	6.17	7.50	6.12	7.44
4395	do.	Stedman.....	6.17	7.50	6.10	7.42
4384	do.	Raeford.....	6.17	7.50	6.06	7.37
4463	do.	Fayetteville.....	6.17	7.50	6.02	7.32
4394	do.	do.	6.17	7.50	6.02	7.32
4400	do. Gastonia, N. C.	Gastonia.....	6.17	7.50	6.14	7.47
4484	do. Gibson, N. C.	Star.....	6.17	7.50	6.30	7.66
4354	do. Goldsboro, N. C.	Waddell.....	6.17	7.50	6.54	7.95

ANALYSES OF COTTON-SEED MEAL.

Laboratory Number.	Name and Address of Manufacturer.	Where Sampled.	Per Cent Nitrogen Guaranteed.	Equivalent to Ammonia.	Per Cent Nitrogen Found.	Equivalent to Ammonia.
4228	Southern Cotton Oil Co., Goldsboro, N. C.	Goldsboro	6.17	7.50	6.40	7.78
4399	do	Warsaw	6.17	7.50	6.38	7.76
4308	do	Goldsboro	6.17	7.50	6.30	7.66
4440	do	Bolton	6.17	7.50	6.22	7.56
4475	do	Memphis, Tenn.	6.17	7.50	6.58	8.00
4485	do	New Decatur, Ala.	6.17	7.50	6.22	7.56
4232	do	Rocky Mount, N. C.	6.17	7.50	6.10	7.42
4503	do	Littleton	6.17	7.50	5.78	7.03
4215	do	Selma, N. C.	6.17	7.50	6.04	7.34
4370	do	do	6.17	7.50	5.86	7.12
4439	do	Shelby, N. C.	6.17	7.50	6.14	7.47
4374	do	Spartanburg, S. C.	6.17	7.50	6.26	7.61
4505	do	Tarboro, N. C.	6.17	7.50	6.26	7.61
4323	do	Tarboro	6.17	7.50	6.24	7.59
4366	do	Snow Hill	6.17	7.50	5.92	7.20
4360	do	Wadesboro, N. C.	6.17	7.50	6.28	7.64
4495	do	Wilson, N. C.	6.17	7.50	6.22	7.56
4494	do	do	6.17	7.50	6.20	7.54
4490	Spring Hope Cotton Oil Co., Spring Hope, N. C.	Middlesex	6.17	7.50	6.36	7.73
4251	Stanly Cotton Oil Co., Norwood, N. C.	Norwood	6.17	7.50	7.04	8.56
4541	do	do	6.17	7.50	7.00	8.51
4250	do	do	6.17	7.50	6.86	8.34
4510	Tar River Oil Co., Tarboro, N. C.	Shiloh	6.17	7.50	6.48	7.88
4511	do	Bracebridge	6.17	7.50	6.26	7.61
4226	do	Washington	6.17	7.50	5.88	7.15
4529	Tate Bros., Memphis, Tenn.	Hamilton	6.17	7.50	6.28	7.64
4446	Tyger Shoals Milling Co., Wellford, S. C.	Bryson City	6.17	7.50	6.24	7.59
4233	Verner Oil Co., Lattimore, N. C.	Lattimore	6.17	7.50	6.78	8.24
4324	Wells, J. Lindsay, Memphis, Tenn.	Washington	6.17	7.50	6.54	7.95
4398	do	Plymouth	6.17	7.50	6.54	7.95
4391	do	Raleigh	6.17	7.50	6.22	7.56
4336	do	do	6.17	7.50	6.16	7.49
4407	Wilmington Oil Mills, Wilmington, N. C.	Pollockville	6.17	7.50	6.04	7.34
4486	Wildmont Oil Mills, Pelzer, S. C.	Clyde	6.17	7.50	6.08	7.37
4396	Zebulon Cotton Oil Co., Zebulon, N. C.	Lucama	6.17	7.50	6.56	7.98
4489	do	Middlesex	6.17	7.50	6.36	7.73

III. BRANDS REGISTERED, SEASON 1910-1911.

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Raw Bone Meal.....Total	20.25	3.71	....
Atlantic High Grade 16 Per Cent Acid Phosphate	16.00	....	....
Atlantic 14 Per Cent Acid Phosphate.....	14.00	....	....
Atlantic Dissolved Bone.....	13.00	....	....
Atlantic Acid Phosphate.....	12.00	....	....
Atlantic 10 and 5 Bone and Potash Mixture..	10.00	....	5.00
Atlantic 10 and 4 Bone and Potash Mixture..	10.00	....	4.00
Atlantic Bone and Potash for Grain.....	10.00	....	3.00
Atlantic Bone and Potash Mixture.....	10.00	....	2.00
Atlantic Meal Compound.....	9.00	2.27	2.00
Atlantic Cotton Grower.....	9.00	2.06	1.00
Corona Cotton Compound.....	9.00	1.65	3.00
Atlantic Special Guano.....	9.00	1.65	1.00
Atlantic Special Truck Guano.....	8.00	3.30	4.00
Oriental High Grade Guano.....	8.00	3.30	4.00
Paloma Tobacco Guano.....	8.00	3.30	4.00
Boon's Special Guano.....	8.00	2.47	4.00
Atlantic High Grade Tobacco Guano.....	8.00	2.47	3.00
Atlantic High Grade Cotton Guano.....	8.00	2.47	3.00
Atlantic Tobacco Grower.....	8.00	2.06	3.00
Atlantic Tobacco Compound.....	8.00	2.06	2.00
Atlantic Special Wheat Fertilizer.....	8.00	1.65	2.00
Atlantic Soluble Guano.....	8.00	1.65	2.00
Apex Peanut Grower.....	8.00	1.02	4.00
Atlantic 8 and 5 Bone and Potash Mixture..	8.00	....	5.00
Atlantic 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Atlantic 7 Per Cent Truck Guano.....	7.00	5.77	7.00
Atlantic Potato Guano.....	7.00	4.12	5.00
Perfection Peanut Grower.....	7.00	....	5.00
Atlantic Side Dresser.....	4.00	8.22	4.00
Atlantic Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Atlantic Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>Geo. L. Arps & Co., Norfolk, Va.—</i>			
Arps' H. G. 16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Arps' 10 and 2 Bone and Potash Mixture....	10.00	....	2.00
Arps' "Go-a-Head" Guano for Trucks, Cotton and Tobacco	8.00	3.30	4.00
Arps' Tobacco Guano.....	8.00	2.47	3.00
Arps' Quick Growth for All Crops.....	8.00	2.47	3.00
Arps' Premium Guano for Cotton, Tobacco and All Spring Crops.....	8.00	1.65	2.00
Geo. L. Arps & Co.'s Big Yield Guano.....	8.00	1.65	2.00
Arps' Standard Truck Guano.....	7.00	4.12	5.00
Arps' Potato Guano.....	6.00	5.76	5.00
Arps' Scuppernong Guano for Trucks.....	6.00	4.12	7.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Atlantic Fertilizer Company, Atlanta, Ga.—</i>			
Atlantic "N" High Grade Acid Phosphate....	16.00	....	....
Atlantic "O" High Grade Acid Phosphate...	14.00	....	....
Atlantic "P" Standard Grade Acid Phosphate.	13.00	....	....
Atlantic "A" High Grade Guano.....	10.00	2.47	3.00
Atlantic "G" High Grade Guano.....	10.00	1.65	2.00
Atlantic "K" High Grade Phosphate and Potash	10.00	....	4.00
Atlantic "M" Standard Grade Phosphate and Potash	10.00	....	2.00
Atlantic "D" High Grade Guano.....	9.00	1.65	3.00
Atlantic "F" Cotton-seed Meal Comp. H. G...	9.00	1.65	3.00
Atlantic "B" High Grade Guano.....	8.00	3.29	4.00
Atlantic "C" High Grade Guano.....	8.00	2.47	3.00
Cutehin's King Cotton.....	8.00	2.47	3.00
Atlantic "E" Cotton-seed Meal Comp. H. G...	8.00	2.47	3.00
Atlantic "H" Standard Grade Guano.....	8.00	1.65	2.00
Atlantic "I" Standard Grade Guano.....	8.00	.82	4.00
Atlantic "L" Standard Grade Phosphate and Potash	8.00	....	4.00
Atlantic Nitrate of Soda.....	....	15.22	....
Atlantic Muriate of Potash.....	....	....	50.00
Atlantic Sulphate of Potash.....	....	....	49.00
Atlantic German Kainit.....	....	....	12.40
<i>Acme Manufacturing Co., Wilmington, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
Acme High Grade Acid Phosphate.....	14.00	....	....
Acme Acid Phosphate.....	13.00	....	....
Acme Bone and Potash.....	12.00	....	6.00
Acme Bone and Potash.....	12.00	....	5.00
Acme Bone and Potash.....	12.00	....	4.00
Acme Bone and Potash.....	12.00	....	3.00
Acme Bone and Potash.....	12.00	....	2.00
Acme Bone and Potash.....	11.00	....	6.00
Acme Bone and Potash.....	11.00	....	5.00
Acme Bone and Potash.....	11.00	....	4.00
Acme Bone and Potash.....	11.00	....	3.00
Acme Bone and Potash.....	11.00	....	2.00
Acme Bone and Potash.....	10.00	....	6.00
Acme Melon Grower.....	10.00	3.30	5.00
Acme Bone and Potash.....	10.00	....	5.00
Acme Bone and Potash.....	10.00	....	4.00
Acme Bone and Potash.....	10.00	....	3.00
Acme Bone and Potash.....	10.00	....	2.00
Acme Cotton Grower.....	9.00	2.27	2.00
Acme Special Fertilizer for Cotton.....	8.00	4.12	7.00
Acme Plumb Good Fertilizer.....	8.00	3.30	6.00
Acme "OK" Fertilizer.....	8.00	3.30	4.00
Acme "OK" Fertilizer for Tobacco.....	8.00	3.30	4.00
Quickstep Fertilizer	8.00	3.30	4.00
Quickstep Fertilizer for Tobacco.....	8.00	3.30	4.00
Acme Crop Grower.....	8.00	2.47	4.00
Currie's High Grade Fertilizer.....	8.00	2.47	4.00
Acme Crop Grower for Tobacco.....	8.00	2.47	4.00
Best's Fish Scrap for Tobacco.....	8.00	2.47	3.00
Best's Fish Scrap Guano.....	8.00	2.47	3.00
Pee Dee Special Fertilizer.....	8.00	2.47	3.00
Pee Dee Special for Tobacco.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Acme Plant Food.....	8.00	2.47	2.50
Acme Fertilizer for Tobacco.....	8.00	2.47	2.50
Acme Fertilizer.....	8.00	2.47	2.50
Tiptop Crop Grower.....	8.00	2.06	3.00
Tiptop Tobacco Grower.....	8.00	2.06	3.00
Lattimer's Complete Fertilizer.....	8.00	2.06	2.00
Best's Complete Fertilizer.....	8.00	2.06	2.00
Cotton-seed Meal Guano.....	8.00	1.65	2.00
Gem Fertilizer.....	8.00	1.65	2.00
Cotton-seed Meal Guano for Tobacco.....	8.00	1.65	2.00
Gem Fertilizer for Tobacco.....	8.00	1.65	2.00
Acme Special Grain Fertilizer.....	8.00	1.65	2.00
Acme Bone and Potash.....	8.00	....	6.00
Acme Bone and Potash.....	8.00	....	5.00
Acme Bone and Potash.....	8.00	....	4.00
Acme Root Crop Guano.....	7.00	4.12	7.00
Acme Standard Truck Guano.....	7.00	4.12	5.00
Acme High Grade Guano.....	6.00	4.95	8.00
Acme Truck Grower.....	6.00	3.30	8.00
Acme Corn Guano.....	6.00	2.47	3.00
Dried Fish Scrap.....	4.50	8.02	....
Acme Special 4-10-4 Guano.....	4.00	8.25	4.00
Clark's Corn Guano.....	1.00	6.58	10.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.83	....
Ground Dried Blood.....	....	12.91	....
Acme Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	48.00
Muriate of Potash.....	....	....	48.00
High Grade German Kainit.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Ashepool Fertilizer Co., Charleston, S. C.—

High Grade Ashepool Dissolved Phosphate....	16.00	....	....
High Grade Ashepool Acid Phosphate.....	14.00	....	....
High Grade Ashepool XXXX Acid Phosphate.....	14.00	....	....
High Grade Entaw Acid Phosphate.....	14.00	....	....
Standard Ashepool XXX Acid Phosphate.....	13.00	....	....
Standard Ashepool Dissolved Bone.....	13.00	....	....
Standard Entaw XXX Acid Phosphate.....	13.00	....	....
Standard Carolina Acid Phosphate.....	13.00	....	....
Standard Circle Bone.....	13.00	....	....
H. G. Ashepool Bone and Potash.....	12.00	....	2.00
Standard Ashepool Acid Phosphate and Potash.....	12.00	....	1.00
Standard Entaw Acid Phosphate and Potash.....	12.00	....	1.00
Standard Entaw XX Acid Phosphate.....	12.00	....	....
Standard Coomassie Acid Phosphate.....	12.00	....	....
Standard Ashepool XX Acid Phosphate.....	12.00	....	....
Standard Ashepool Potash and Acid Phosphate.....	11.00	....	1.00
Standard Entaw Potash Acid Phosphate.....	11.00	....	1.00
Standard Palmetto Potash Acid Phosphate....	11.00	....	1.00
High Grade Ashepool Watermelon Guano....	10.00	3.29	5.00
H. G. Ashepool Cantaloupe Guano.....	10.00	2.46	10.00
H. G. Ashepool Golden Fertilizer.....	10.00	1.65	2.00
Taylor's XX Ammoniated Dissolved Fertilizer.....	10.00	.82	1.00
H. G. Entaw Superpotash Acid Phosphate....	10.00	....	4.00
High Grade Ashepool Superpotash Acid Phosphate.....	10.00	....	4.00
Standard Ashepool Potash Compound.....	10.00	....	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Enoee Acid Phosphate and Potash.	10.00	....	2.00
Standard Ashepoo Wheat and Oats Specific..	9.50	1.65	1.00
Standard Ashepoo Fertilizer.....	9.00	1.85	1.00
Standard Eutaw Fertilizer.....	9.00	1.85	1.00
High Grade Taylor's Circle Guano.....	9.00	1.65	4.00
Standard Ashepoo Harrow Brand Raw Bone Superphosphate	9.00	1.65	2.00
Standard Eutaw XXX Guano.....	9.00	1.65	2.00
Standard Ashepoo Guano.....	8.50	2.06	1.00
Standard Eutaw XX Guano.....	8.50	1.65	2.00
Standard Ashepoo XX Guano.....	8.50	1.65	2.00
High Grade Ashepoo Fruit Grower.....	8.00	3.91	2.75
High Grade Ashepoo Perfection Guano.....	8.00	3.29	6.00
High Grade Ashepoo Guano.....	8.00	3.29	4.00
High Grade Ashepoo Ammoniated Superphos- phate	8.00	2.46	4.00
High Grade Eutaw X Golden Fertilizer.....	8.00	2.46	4.00
High Grade Ashepoo Bird and Fish Guano...	8.00	2.46	3.00
High Grade Ashepoo Meal Mixture.....	8.00	2.46	3.00
High Grade Ashepoo X Tobacco Fertilizer...	8.00	2.46	3.00
High Grade Ashepoo Golden Tobacco Pro- ducer	8.00	2.46	3.00
High Grade Carolina XXX Guano.....	8.00	2.46	3.00
High Grade Eutaw Special Cotton-seed Meal Guano	8.00	2.46	2.00
High Grade Ashepoo Farmers' Special.....	8.00	2.06	3.00
Standard Eutaw Circle Guano.....	8.00	2.06	2.00
Standard Ashepoo Circle Guano.....	8.00	2.06	2.00
Standard Coomassie Circle Fertilizer.....	8.00	1.65	2.00
Standard Carolina Guano.....	8.00	1.65	2.00
Standard P. D. Fertilizer.....	8.00	1.65	2.00
Standard Ashepoo XXX Guano.....	8.00	1.65	2.00
Standard Ashepoo Special Fertilizer.....	8.00	1.65	2.00
Standard Bronwood Acid Phosphate.....	8.00	....	4.00
High Grade Ashepoo Truck Guano.....	7.00	4.12	5.00
High Grade Ashepoo Vegetable Guano.....	5.00	4.12	5.00
High Grade Ashepoo Nitrogenous Top Dress- ing	3.00	7.00	2.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	45.00
German Kainit .....	....	....	12.00

*The Armour Fertilizer Works, Atlanta, Chicago
and Wilmington—*

Armour's Raw Bone Meal.....Total	22.00	3.70	....
17 Per Cent Acid Phosphate.....	17.00	....	....
16 Per Cent Acid Phosphate.....	16.00	....	....
Armour's 15 Per Cent Acid Phosphate.....	15.00	....	....
Star Phosphate	14.00	....	....
13 Per Cent Acid Phosphate.....	13.00	....	....
12 Per Cent Acid Phosphate.....	12.00	....	....
Sampson Corn Mixture.....	11.00	....	5.00
Fertilizer, No. 1044.....	10.00	3.30	4.00
Fertilizer, No. 1025.....	10.00	1.65	5.00
Shield Fertilizer, No. 1023.....	10.00	1.65	3.00
Ammoniated Dissolved Bone and Potash.....	10.00	1.65	2.00
"State Farm"	10.00	....	7.00
Phosphoric Acid and Potash.....	10.00	....	5.00
Superphosphate and Potash.....	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
M. H. White & Co.'s Special Corn Mixture...	10.00	....	2.00
Phosphate and Potash, No. 1.....	10.00	....	2.00
African Cotton Grower.....	9.00	2.47	3.00
Armour's Bright Tobacco Grower.....	9.00	1.65	3.00
Bone and Dissolved Bone with Potash.....	9.00	1.65	3.00
Fertilizer, No. 913.....	9.00	.82	3.00
Standard Cotton Grower.....	8.50	1.65	2.00
Bone, Blood and Potash.....	8.00	4.11	7.00
Van Lindley's Special.....	8.00	4.11	2.00
Fertilizer, No. 846.....	8.00	3.30	6.00
Fertilizer, No. 844.....	8.00	3.30	4.00
Special Trucker	8.00	3.30	4.00
All Soluble	8.00	2.88	4.00
Truck and Berry Special.....	8.00	2.47	10.00
Underwood's Special	8.00	2.47	10.00
Fertilizer, No. 836.....	8.00	2.47	6.00
Fertilizer, No. 834.....	8.00	2.47	4.00
Underwood's Favorite	8.00	2.47	3.00
Cotton Special	8.00	2.47	3.00
Tobacco Special	8.00	2.47	3.00
Trucker's Special	8.00	2.47	3.00
Carolina Cotton Grower.....	8.00	2.47	2.00
Berry King	8.00	2.05	4.00
Gold Medal for Tobacco.....	8.00	2.05	3.00
Sweet Potato Special.....	8.00	2.05	3.00
Champion	8.00	2.05	2.50
King Cotton	8.00	2.05	2.00
High Grade Potato.....	8.00	1.65	10.00
Fruit and Root Crop Special.....	8.00	1.65	5.00
Carolina Cotton Special.....	8.00	1.65	3.00
Armour's Slaughter House Fertilizer.....	8.00	1.65	2.00
General	8.00	1.65	2.00
Fertilizer, No. 813.....	8.00	.82	3.00
Phosphate and Potash, No. 2.....	8.00	....	5.00
Phosphate and Potash, No. 3.....	8.00	....	4.00
7 Per Cent Trucker.....	6.00	5.76	5.00
5 Per Cent Trucker.....	6.00	4.11	7.00
Manure Substitute	6.00	3.30	4.00
10 Per Cent Trucker.....	5.00	8.24	3.00
Top Dresser	5.00	8.24	2.00
Armour's Top Dresser.....	4.00	6.18	2.50
Special Formula for Tobacco.....	4.00	3.30	5.00
Harvey's Special	4.00	3.30	4.00
10 Per Cent Tankage.....	2.00	8.24	....
Nitrate of Soda.....	....	14.81	....
Dried Blood .....	....	13.16	....
Armour's Top Dresser.....	....	7.83	4.00
Sulphate of Potash .....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

American Fertilizer Co., Norfolk, Va.—

Bone Meal	Total	22.50	3.71	....
American High Grade Acid Phosphate.....		16.00	....	....
High Grade Acid Phosphate.....		14.00	....	....
Eagle Brand Acid Phosphate.....		13.00	....	....
Double Extra Bone and Potash.....		12.00	....	5.00
Acid Phosphate		12.00	....	....
American Standard Cotton Grower.....		10.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
American Formula for Wheat and Corn.....	10.00	....	5.00
Double Dissolved Bone and Potash.....	10.00	....	4.00
Dissolved Bone and Potash for Corn and Wheat	10.00	....	2.00
Strawberry and Asparagus Guano.....	9.00	2.88	9.00
Pitt County Special Fertilizer.....	9.00	2.88	5.00
Special Formula Guano for Yellow Leaf To- bacco	9.00	2.88	5.00
American Bone Mixture.....	9.00	.83	2.00
Blood and Bone Compound.....	8.50	2.06	1.00
Peruvian Mixture	8.50	1.65	1.50
Peruvian Mixture Guano Especially Prepared for Sweet Potatoes.....	8.00	3.29	5.00
N. C. and S. C. Cotton Grower.....	8.00	3.29	4.00
American Nonpareil Tobacco Grower.....	8.00	3.29	4.00
American Eagle Guano.....	8.00	2.47	3.00
J. G. Miller & Co.'s Yellow Leaf Fertilizer...	8.00	2.47	3.00
American No. 1 Fertilizer.....	8.00	2.06	3.00
Bob White Fertilizer for Tobacco.....	8.00	2.06	1.50
A. L. Hanna's Special.....	8.00	1.65	2.00
American No. 2 Fertilizer.....	8.00	1.65	2.00
American Special Potash Mixture for Wheat.	8.00	....	4.00
10 Per Cent Ammoniated Guano.....	7.00	8.24	2.50
American 7-7-7 for Irish Potatoes.....	7.00	5.76	7.00
Standard 7 Per Cent Ammonia Guano.....	7.00	5.76	5.00
Special Potato Guano.....	7.00	4.12	7.00
Kale, Spinach and Cabbage Guano.....	7.00	4.12	4.00
American Fish Scrap Guano.....	7.00	3.29	4.00
Stable Manure Substitute.....	7.00	2.47	4.00
Special Potato Manure.....	6.00	4.12	7.00
American Standard Top Dresser.....	4.00	8.24	4.00
Nitrate of Soda.....	....	14.83	....
Ground Fish Scraps.....	....	8.24	....
American High Grade Top Dresser.....	....	7.41	3.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*American Agricultural Chemical Co., Baltimore
and New York—*

Fine Ground Bone.....Total	22.88	2.47	....
Pure Ground Bone.....Total	20.59	3.70	....
Superphosphate	16.00	....	....
Canton Baker's Dissolved S. C. Phosphate...	14.00	....	....
Detrick's XXtra Acid Phosphate.....	14.00	....	....
Lazaretto Acid Phosphate.....	14.00	....	....
Zell's Dissolved Phosphate.....	14.00	....	....
Zell's Acid Phosphate.....	13.00	....	....
Canton Chemical Gem Phosphate.....	12.00	....	....
Southern Wheat Grower.....	12.00	....	6.00
Detrick's Victory Alkaline Bone.....	12.00	....	5.00
Lazaretto High Grade Dissolved Phosphate and Potash	12.00	....	5.00
Canton Soluble Alkaline Phosphate.....	12.00	....	3.00
Detrick's P. & B. Special Fertilizer.....	12.00	....	3.00
Lazaretto Alkaline Bone Phosphate.....	12.00	....	3.00
New Rival Crop Producer.....	10.00	.82	1.00
Zell's High Grade Potash Fertilizer.....	10.00	....	4.00
Royal Alkaline Bone.....	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Canton Soluble Phosphate Potash.....	10.00	....	2.00
Detrick's Soluble Phosphate and Potash.....	10.00	....	2.00
Lazaretto Dissolved Phosphate and Potash...	10.00	....	2.00
Zell's Electric Phosphate.....	10.00	....	2.00
Tip Top Special.....	9.00	2.47	7.00
Special Tobacco Fertilizer.....	9.00	2.47	3.00
Holmes & Dawson's Productive Cotton and Peanut Grower	9.00	2.47	2.00
Zell's Royal High Grade Fertilizer.....	9.00	2.06	2.00
Zell's Victoria Animal Bone Compound.....	9.00	1.85	4.00
Canton Chemical Animal Bone Fertilizer.....	9.00	1.85	4.00
Detrick's Superior Animal Bone Fertilizer...	9.00	1.85	4.00
Lazaretto Retriever Animal Bone Fertilizer...	9.00	1.85	4.00
Holmes & Dawson's Gold Dust Guano.....	9.00	1.65	2.00
Lazaretto Peanut Grower.....	9.00	.82	3.00
Reese Pacific Guano for Tobacco.....	8.50	2.47	2.50
Lazaretto Manure Substitute.....	8.00	3.29	4.00
Lazaretto Carolina Cotton Food.....	8.00	3.29	4.00
Excelsior Compound for Tobacco.....	8.00	2.47	5.00
Detrick's Quick Step Phosphate for Potatoes and Tobacco	8.00	2.47	4.00
Zell's Special Compound for Potatoes and Veg- etables	8.00	2.47	4.00
Zell's Tobacco Fertilizer.....	8.00	2.47	4.00
Zell's Bright Tobacco Grower.....	8.00	2.47	3.00
Zell's Reliance High Grade Manure.....	8.00	2.47	3.00
Canton Chemical Baker's Tobacco Fertilizer.	8.00	2.47	3.00
Canton Chemical Superior High Grade Fer- tilizer	8.00	2.47	3.00
Detrick's Special Tobacco Fertilizer.....	8.00	2.47	3.00
Lazaretto Challenge Fertilizer.....	8.00	2.47	3.00
Lazaretto Special Tobacco and Potato Fer- tilizer	8.00	2.47	3.00
Canton Chemical CUC Special Compound....	8.00	2.06	6.00
Canton Chemical Baker's Standard High Grade Guano	8.00	2.06	3.00
Detrick's Vegetator Ammoniated Superphos- phate	8.00	2.06	3.00
Lazaretto Climax Plant Food.....	8.00	2.06	3.00
Slugluff's British Mixture.....	8.00	2.06	2.50
Lazaretto Universal Compound.....	8.00	2.06	2.00
Canton Chemical Virginia Standard Manure.	8.00	2.06	2.00
Detrick's Kangaroo Komplete Komound....	8.00	1.65	3.00
Canton Chemical Baker's Fish Guano.....	8.00	1.65	2.00
Canton Chemical Game Guano.....	8.00	1.65	2.00
Detrick's Royal Crop Grower.....	8.00	1.65	2.00
Detrick's Fish Mixture.....	8.00	1.65	2.00
Holmes & Dawson's Dawson's Crop Maker...	8.00	1.65	2.00
Holmes & Dawson's Triumph Soluble.....	8.00	1.65	2.00
Lazaretto Crop Grower.....	8.00	1.65	2.00
Reese Pacific Guano.....	8.00	1.65	2.00
Zell's Special Compound for Tobacco.....	8.00	1.65	2.00
Zell's Calvert Guano.....	8.00	1.65	2.00
Zell's Ammoniated Superphosphate.....	8.00	1.65	2.00
Zell's Fish Guano.....	8.00	1.65	2.00
Savage, Son & Co. Purity Guano.....	8.00	1.65	2.00
Moro Phillip's Standard Guano.....	8.00	.82	4.00
Fidelity Crop Grower.....	8.00	.82	3.00
Enterprise Alkaline Bone.....	8.00	....	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Palmetto Alkaline Phosphate.....	8.00	....	4.00
Canton Chemical Excelsior Trucker.....	7.00	4.11	5.00
Detrick's Special Trucker.....	7.00	4.11	5.00
Lazaretto Early Trucker.....	7.00	4.11	5.00
Zell's Truck Grower.....	7.00	4.11	5.00
Empire Trucker	7.00	3.29	4.00
Zell's 7 Per Cent Potato and Vegetable Ma- nure	6.00	5.76	5.00
Canton Chemical Truckers' Special 7 Per Cent.	6.00	5.76	5.00
Detrick's Gold Basis.....	6.00	5.76	5.00
Lazaretto Truckers' Favorite.....	6.00	5.76	5.00
Bull Head Potato and Vegetable Manure....	6.00	4.11	7.00
Detrick's Gold Eagle.....	6.00	2.47	6.00
Zell's 10 Per Cent Trucker.....	5.00	8.23	3.00
Nitrate of Soda.....	....	15.00	....
Special H. G. Dried Blood.....	....	13.16	....
Special High Grade Dried Blood.....	....	13.16	....
Dry Ground Fish.....	....	8.23	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

A. D. Adair & McCarty Bros., Atlanta, Ga.—

Adair's High Grade Dissolved Bone, No. 16..	16.00
A. and M. 15-4.....	15.00	....	4.00
Adair's High Grade Dissolved Bone.....	14.00	....	....
A. and M. 13-4.....	13.00	....	4.00
McCarty's Potash Formula, No. 5.....	12.00	....	5.00
McCarty's Potash Formula, No. 4.....	12.00	....	4.00
McCarty's Potash Formula.....	12.00	....	2.00
Adair's Dissolved Bone.....	12.00	....	....
David Harum Extra High Grade Blood Guano.	10.00	3.20	4.00
Adair's H. G. Blood and Bone.....	10.00	2.47	3.00
Special Wheat Compound.....	10.00	1.65	4.00
Special Corn Compound.....	10.00	1.65	4.00
Special Vegetable Compound.....	10.00	1.65	4.00
Special Potato Compound.....	10.00	1.65	4.00
Special Cotton Compound.....	10.00	1.65	4.00
Special Tomato Compound.....	10.00	1.65	4.00
Adair's Soluble Pacific Guano.....	10.00	1.65	2.00
McCarty's High Grade Cotton Grower.....	10.00	1.65	2.00
McCarty's High Grade Corn Grower.....	10.00	1.65	2.00
Old Time Fish Scrap Guano.....	10.00	1.65	2.00
McCarty's Wheat Special.....	10.00	.82	3.00
McCarty's Corn Special.....	10.00	.82	3.00
McCarty's Cotton Special.....	10.00	.82	3.00
Adair's Wheat and Corn Grower, No. 8.....	10.00	....	8.00
H. G. Potash Compound, No. 8.....	10.00	....	8.00
H. G. Potash Compound, No. 6.....	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 6.....	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 5.....	10.00	....	5.00
H. G. Potash Compound, No. 5.....	10.00	....	5.00
High Grade Potash Compound.....	10.00	....	4.00
Adair's Wheat and Corn Grower.....	10.00	....	4.00
Adair's Formula	10.00	....	2.00
Dixie High Grade Soil Food.....	9.00	1.65	3.00
Adair's Blood, Bone and Tankage Guano....	9.00	.82	2.00
Special Corn Grower.....	8.00	1.65	6.00
Special Wheat Grower.....	8.00	1.65	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Special Potato Grower.....	8.00	1.65	6.00
Special Vegetable Grower.....	8.00	1.65	6.00
Standard Corn Grower.....	8.00	1.65	2.00
Planters' Soluble Fertilizer.....	8.00	1.65	2.00
Adair's Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Golden Grain Compound.....	8.00	.82	3.00
Adair's Special Potash Mixture, No. 6.....	8.00	....	6.00
Adair's Special Potash Mixture, No. 5.....	8.00	....	5.00
Adair's Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	15.00	....
Kainit .....	....	....	12.00
Muriate of Potash.....	....	....	50.00

Asheville Packing Co., Asheville, N. C.—

Asheville Packing Co.'s Pure Bone Meal.			
Total	18.00	2.00	....
Asheville Packing Co.'s H. G. Phosphoric Acid.	16.00	....	....
Asheville Packing Co.'s Standard Phosphoric Acid	14.00	....	....
Asheville Packing Co.'s Extra H. G. Potash Mixture	13.00	....	4.00
Asheville Packing Co.'s Standard Phosphoric Acid	12.00	....	....
Asheville Packing Co.'s Celebrated Tankage.			
Total	10.00	4.12	....
Asheville Packing Co.'s Extra H. G. Fertilizer.	10.00	3.30	4.00
Asheville Packing Co.'s Blood and Bone.....	10.00	2.47	3.00
Asheville Packing Co.'s Extra H. G. Cotton Special	10.00	1.65	4.00
Asheville Packing Co.'s High Grade Biltmore Wheat Grower	10.00	1.65	3.00
Asheville Packing Co.'s H. G. Wheat, Corn and Oat Special.....	10.00	1.65	2.00
Asheville Packing Co.'s Standard Bone and Potash	10.00	.82	1.00
Asheville Packing Co.'s Superior Potato and Wheat Fertilizer	10.00	....	6.00
Asheville Packing Co.'s Special Potash Mixture	10.00	....	4.00
Asheville Packing Co.'s XXX Wheat Grower.	10.00	....	2.00
Asheville Packing Co.'s Standard Potato Fertilizer	9.00	.82	2.00
Asheville Packing Co.'s Extra H. G. Vegetable Special	8.00	4.12	5.00
Asheville Packing Co.'s Corn and Vegetable Special	8.00	2.47	3.00
Asheville Packing Co.'s Special Tobacco and Vegetable Fertilizer	8.00	2.47	3.00
Asheville Packing Co.'s Fruit Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Potato Special.....	8.00	1.65	6.00
Asheville Packing Co.'s Champion Potato Fertilizer	8.00	1.65	4.00
Asheville Packing Co.'s Complete Fertilizer..	8.00	1.65	2.00
Asheville Packing Co.'s Standard Corn and Wheat	8.00	.82	3.00
Asheville Packing Co.'s Special Bone and Potash	8.00	....	4.00
Asheville Packing Co.'s H. G. Muriate of Potash .....	....	....	50.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Baugh & Sons Co., Phila., Pa., and Norfolk, Va.—</i>			
Baugh's Raw Bone Meal. Warranted Pure,			
Total	21.50	3.70	....
Baugh's 16 Per Cent Acid Phosphate.....	16.00	....	....
Baugh's Pure Bone and Muriate of Potash			
Mixture	15.00	2.47	5.00
Baugh's High Grade Acid Phosphate.....	14.00	....	....
Baugh's Pure Dissolved Animal Bones.....	13.00	2.06	....
Baugh's 12 and 5 Phosphate and Potash.....	12.00	....	5.00
Baugh's High Grade Cotton and Truck Guano.	10.00	1.65	2.00
Baugh's High Grade Potash Mixture.....	10.00	....	4.00
Baugh's Soluble Alkaline Superphosphate....	10.00	....	2.00
Hassell's Tobacco Guano.....	9.00	2.26	2.00
Baugh's Fish, Bone and Potash.....	8.00	3.30	4.00
Baugh's Fruit and Berry Guano.....	8.00	2.47	10.00
Baugh's Special Tobacco Guano.....	8.00	2.47	5.00
Baugh's Grand Rapids High Grade Truck			
Guano	8.00	2.47	3.00
Baugh's Sweet Potato Guano for Sweet Pota-			
toes, Peas and Melons.....	8.00	2.47	3.00
Baugh's High Grade Tobacco Guano.....	8.00	2.47	3.00
Baugh's Complete Animal Base Fertilizer...	8.00	1.65	5.00
Baugh's Fish Mixture.....	8.00	1.65	2.00
Baugh's Animal Base and Potash Compound			
for All Crops.....	8.00	1.65	2.00
Baugh's Wheat Fertilizer for Wheat and			
Grass	8.00	1.65	2.00
Baugh's Southern States Excelsior Guano....	8.00	1.00	3.00
Glover's Special Potato Guano.....	7.00	3.30	8.00
Baugh's Southern States Guano for Bright			
Tobacco	7.00	2.88	7.00
Baugh's Potato and Truck Special.....	7.00	2.88	7.00
Baugh's Strawberry Mixture.....	7.00	2.47	5.00
Baugh's Fine Ground Fish.....	6.87	8.23	....
Baugh's 7 Per Cent Potato Guano.....	6.00	5.76	5.00
Baugh's Peruvian Guano Substitute for Pota-			
toes and All Vegetables.....	6.00	4.12	7.00
Baugh's 5-6-5 Guano.....	6.00	4.12	5.00
Baugh's Farmers' Friend Guano.....	6.00	4.12	5.00
Baugh's New Process 10 Per Cent Guano....	5.00	8.23	2.50
Baugh's Special Potato Manure.....	5.00	1.65	10.00
Baugh's Wrapper Leaf Brand for Seed Leaf			
Tobacco	3.50	3.30	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.23	....
Baugh's Fine Ground Dried Blood.....	....	13.16	....
Fine Ground Blood.....	....	13.00	....
Baugh's Soluble Top Dresser for All Crops..	....	8.23	3.00
Baugh's Fine Ground Tankage.....	....	7.40	....
Muriate of Potash.....	....	....	48.00
High Grade Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>M. J. Best & Sons, Goldsboro, N. C.—</i>			
Pure German Kainit.....	....	....	12.00
<i>S. T. Beveridge & Co., Richmond, Va.—</i>			
Beveridge's Raw Ground Bone Meal.....	20.00	4.50	....
Beveridge's Thomas or Basic Slag.....	18.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
<i>Paisley Boney, Goldsboro, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
<i>J. A. Benton, Ruffin, N. C.—</i>			
Benton's North Carolina Bright Fertilizer...	9.00	1.65	2.00
<i>Baltimore Fertilizer Co., Baltimore, Md.—</i>			
Honest Acid Phosphate.....	14.00	....	....
Honest Bone and Potash.....	10.00	....	2.00
Honest Sweet Potato Grower.....	8.00	2.40	4.00
Honest Cotton Grower.....	8.00	2.40	3.00
Honest Ammoniated Bone.....	8.00	1.60	2.00
Honest Revenue	7.00	2.40	6.00
Honest Success	7.00	.82	4.00
Honest Dixie Trucker.....	6.00	4.00	7.00
Honest Trucker	6.00	4.00	5.00
<i>Bertie Cotton Oil Co., Auander, N. C.—</i>			
Bertie's High Grade Guano.....	8.00	4.13	5.00
Bertie's Meal Mixture.....	8.00	3.30	4.00
Bertie's Tobacco Grower.....	8.00	2.47	5.00
Bertie's Ideal Cotton Grower.....	8.00	2.47	3.00
Bertie's Special Compound.....	8.00	1.65	2.00
Bertie's Corn Mixture.....	7.00	2.47	2.00
Peanut Grower	7.00	1.65	5.00
Bertie's Peanut Special.....	7.00	.82	4.00
Tar Heel Top Dresser.....	2.00	8.25	5.00
Nitrate of Soda.....	....	15.00	....
Sulphate of Potash.....	....	....	52.00
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00
<i>Bowker Fertilizer Co., Baltimore, Md.—</i>			
Pure Ground Bone.....Total	20.59	3.70	....
Fine Ground Bone.....Total	22.88	2.47	....
16 Per Cent Dissolved Bone Phosphate.....	16.00	....	....
Bowker's Soluble Phosphate.....	14.00	....	....
Golden Harvest Fertilizer.....	12.00	....	5.00
Superphosphate with Potash for Grain and Grass	10.00	....	2.00
Sure Crop Phosphate.....	9.00	.82	2.00
Tobacco Fertilizer	8.00	2.47	3.00
Eureka Cotton Compound.....	8.00	2.47	3.00
Empire Standard	8.00	1.65	2.00
Corn and Grain Grower.....	8.00	.82	4.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00
<i>Blackstone Guano Co., Inc., Blackstone, Va.—</i>			
Blackstone Raw Bone.....Total	20.00	3.70	....
Clover Leaf 16 Per Cent Phosphate.....	16.00	....	....
B. G. Co. Acid Phosphate.....	14.00	....	....
Clover Leaf Grain Fertilizer.....	13.00	1.03	1.00
Dissolved Bone	10.00	1.03	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
B. G. Co., Inc., Bone and Potash.....	10.00	.....	4.00
B. G. Co. Bone and Potash.....	10.00	.....	2.00
Blackstone Special for Tobacco.....	9.00	2.47	3.00
Old Bellefonte	8.00	3.30	2.00
Clover Leaf Brand for Tobacco.....	8.00	2.47	3.00
Tobacco Special	8.00	2.47	3.00
Wrapper Brand	8.00	2.47	3.00
Jim Crow for Tobacco.....	8.00	2.47	3.00
Bellefonte	8.00	2.47	2.00
Hard Cash for Tobacco.....	8.00	2.06	2.00
Carolina Special for Tobacco.....	8.00	1.65	4.00
Standard Guano	8.00	1.65	2.00
Red Letter for Tobacco.....	8.00	1.65	2.00
Alliance for Tobacco.....	8.00	1.65	2.00
Leader for Tobacco.....	8.00	1.65	2.00
<i>John L. Bailey Co., Elm City, N. C.—</i>			
Fairmont Guano	8.00	2.47	3.00
Stag Brand Fertilizer.....	8.00	1.65	2.00
<i>C. J. Burton Guano Co., Baltimore, Md.—</i>			
Acid Phosphate	14.00	.....	.....
Burton's Alkaline	10.00	.....	4.00
Burton's Potash Mixture.....	10.00	.....	2.00
High Grade Tobacco.....	8.00	3.29	4.00
Burton's Best	8.00	2.47	3.00
Tobacco Queen	8.00	2.47	3.00
Burton's High Grade.....	8.00	2.06	3.00
Burton's Carolina Tobacco Special.....	8.00	1.65	4.00
Burton's Butcher Bone.....	8.00	1.65	2.00
<i>Bradley Fertilizer Co., Charleston, S. C.—</i>			
High Grade Bradley's Dissolved Phosphate..	16.00	.....	.....
High Grade Bradley's Acid Phosphate.....	14.00	.....	.....
Standard Bradley's XXX Acid Phosphate...	13.00	.....	.....
Standard Bradley's Acid Phosphate.....	12.00	.....	.....
Standard Bradley's Palmetto Acid Phosphate.	12.00	.....	.....
H. G. Bradley's Selected Guano.....	10.00	1.65	4.00
High Grade Bradley's Potash Acid Phosphate.	10.00	.....	4.00
Standard Bradley's Wheat Grower.....	10.00	.....	2.00
Standard Bradley's Bone and Potash.....	10.00	.....	2.00
Standard Bradley's Ammoniated Dissolved Bone	9.00	1.85	1.00
Standard Bradley's Patent Superphosphate..	9.00	1.85	1.00
Standard B. D. Sea Fowl Guano.....	9.00	1.85	1.00
Standard Eagle Ammoniated Bone Superphos- phate	9.00	1.85	1.00
High Grade Bradley's Circle Guano.....	8.00	3.29	4.00
High Grade Bradley's Guano.....	8.00	2.46	3.00
Standard Bradley's Cereal Guano.....	8.00	1.65	2.00
Standard Bradley's X Guano.....	8.00	1.65	2.00
German Kainit .....	.....	.....	12.00
<i>Baltimore Pulverizing Co., Baltimore, Md.—</i>			
Royal Guano	8.00	1.65	2.00
5 Per Cent Potato Guano.....	7.00	4.11	5.00
Special 7 Per Cent Potato Guano.....	6.00	5.75	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen	Potash
<i>The Bryant Fertilizer Co., Alexandria, Va.—</i>			
Bryant's Bone Meal.....Total	22.50	2.17	....
Bryant's Acid Phosphate.....	17.00	....	....
Bryant's Acid Phosphate.....	16.00	....	....
Bryant's S. C. Dissolved Bone.....	14.00	....	....
Bryant's H. G. Wheat Mixture.....	12.00	....	6.00
Bryant's Bone and Potash.....	10.00	....	4.00
Bryant's Bone and Potash Mixture.....	10.00	....	2.00
Bryant's "Challenge" Highest Grade Tobacco Mixture.....	9.00	2.46	3.00
Bryant's Special Cotton-seed Meal Fertilizer.....	9.00	2.26	2.00
Bryant's Bone Mixture for Tobacco.....	9.00	2.06	2.00
Bryant's H. G. Guano.....	8.00	3.29	4.00
Bryant's H. G. Fertilizer.....	8.00	2.47	3.00
Bryant's "Victor" Tobacco Fertilizer.....	8.00	2.47	3.00
Bryant's Choice C. S. M. 3 Per Cent Mixture.....	8.00	2.47	2.00
Bryant's "Otter" Special Tobacco Fertilizer.....	8.00	2.06	3.00
Bryant's Cotton and Corn Fertilizer.....	8.00	2.06	2.00
Bryant's Special Fertilizer for Tobacco.....	8.00	2.06	2.00
Bryant's Cotton Grower.....	8.00	1.65	2.00
Bryant's Special Fertilizer.....	8.00	1.65	2.00
Bryant's Cotton-seed Meal Guano.....	8.00	1.65	2.00
Bryant's "Potomac" Bone Special for Tobacco.....	8.00	1.65	2.00
Bryant's Special Formula for Grain and Grass.....	8.00	1.00	4.00
Bryant's Wheat Mixture.....	8.00	....	4.00
Bryant's Truck Grower.....	7.00	5.77	7.00
Bryant's Fish Scrap Guano.....	7.00	3.29	4.00
Bryant's Carolina Top Dresser.....	6.00	5.76	5.00
Bryant's High Grade Top Dresser.....	4.00	8.24	4.00
Bryant's Top Dresser.....	4.00	6.17	2.50
Bryant's Special Top Dresser.....	2.00	5.76	2.50
Nitrate of Soda.....	....	14.82	....
Bryant's Carolina Special Top Dresser.....	....	7.41	3.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Bryant's German Kainit.....	....	....	12.00

The Berkley Chemical Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Resolute Acid Phosphate.....	16.00	....	....
Berkley Acid Phosphate.....	14.00	....	....
Berkley Bone and Potash Mixture.....	11.00	....	2.00
Berkley Plant Food.....	10.00	....	4.00
Laurel Potash Mixture.....	10.00	....	2.00
Monitor Animal Bone Fertilizer.....	9.00	1.85	4.00
Select Crop Grower.....	8.50	2.06	2.50
Victory Special Crop Grower.....	8.00	3.29	4.00
Berkley Tobacco Guano.....	8.00	2.47	3.00
Advance Crop Grower.....	8.00	2.47	3.00
Brandon Superphosphate.....	8.00	1.65	2.00
Long Leaf Tobacco Grower.....	8.00	1.65	2.00
Berkley Peanut and Grain Grower.....	8.00	1.00	4.00
Superior Bone and Potash.....	8.00	....	4.00
Mascot Truck Guano.....	7.00	4.11	5.00
Royal Truck Grower.....	6.00	5.76	5.00
The Leader of the World.....	5.00	3.29	5.00
Berkley Top Dresser.....	4.00	8.23	2.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Bragaw Fertilizer Co., Washington, N. C.—</i>			
Palmetto Acid Phosphate.....	14.00	....	....
Long Acre Bone Phosphate.....	14.00	....	....
Farmers' Union Meal Mixture.....	9.00	2.26	2.00
Beaufort County Guano.....	8.00	2.47	3.00
Havana Tobacco Guano.....	8.00	2.47	3.00
Tuckahoe Tobacco Guano.....	8.00	2.06	3.00
Oid Reliable Premium Guano.....	8.00	1.65	2.00
Tar Heel Guano.....	8.00	1.65	2.00
Pamlico Trucker	7.00	4.12	8.00
Riverview Potato Grower.....	6.00	5.76	5.00
Chocowinity Special Tobacco Guano.....	5.00	3.29	6.00
Sunrise Tobacco Guano.....	4.00	2.47	5.00
Genuine German Kainit.....	....	....	12.00
<i>Conestee Chemical Co., Wilmington, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	....	....
Conestee High Grade Acid Phosphate.....	14.00	....	....
Conestee Acid Phosphate.....	13.00	....	....
Conestee Bone and Potash.....	11.00	....	6.00
Conestee Bone and Potash.....	11.00	....	5.00
Conestee Bone and Potash.....	11.00	....	4.00
Conestee Bone and Potash.....	11.00	....	3.00
Conestee Bone and Potash.....	11.00	....	2.00
Conestee Bone and Potash.....	10.00	....	6.00
Conestee Bone and Potash.....	10.00	....	5.00
Conestee Bone and Potash.....	10.00	....	4.00
Conestee Bone and Potash.....	10.00	....	3.00
Conestee Bone and Potash.....	10.00	....	2.00
Conestee Cotton Grower.....	9.00	2.27	2.00
Conestee Melon Grower.....	8.00	4.11	7.00
Conestee P. D. Q. Fertilizer.....	8.00	3.30	4.00
Conestee "O. K." Fertilizer.....	8.00	3.30	4.00
Conestee P. D. Q. Fertilizer for Tobacco.....	8.00	3.30	4.00
Conestee Plumb Good Fertilizer.....	8.00	2.47	4.00
Conestee Crop Grower for Tobacco.....	8.00	2.47	4.00
Conestee Fish Scrap Guano.....	8.00	2.47	3.00
Conestee Special Fertilizer.....	8.00	2.47	3.00
Conestee Special Tobacco Fertilizer.....	8.00	2.47	3.00
Conestee Fertilizer for Tobacco.....	8.00	2.47	2.50
Conestee Fertilizer	8.00	2.47	2.50
Conestee Crop Grower.....	8.00	2.06	3.00
Conestee Tobacco Grower.....	8.00	2.06	3.00
Conestee Complete Fertilizer.....	8.00	2.06	2.00
Conestee Special Grain Fertilizer.....	8.00	1.65	2.00
Conestee Standard Guano for Tobacco.....	8.00	1.65	2.00
Conestee Standard Guano.....	8.00	1.65	2.00
Cotton-seed Meal Guano for Tobacco.....	8.00	1.65	2.00
Cotton-seed Meal Guano.....	8.00	1.65	2.00
Conestee Bone and Potash.....	8.00	....	6.00
Conestee Bone and Potash.....	8.00	....	5.00
Conestee Bone and Potash.....	8.00	....	4.00
Conestee Root Crop Guano.....	7.00	4.11	7.00
Conestee High Grade Guano.....	6.00	4.95	8.00
Conestee Truck Grower.....	6.00	3.30	8.00
Conestee Corn Guano.....	6.00	2.47	3.00
Dried Fish Scrap.....	4.50	8.02	....
Conestee Special Top Dresser.....	4.00	8.25	4.00
Sulphate of Ammonia.....	....	20.62	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	14.83	....
Ground Dried Blood.....	12.91	....
Conestee Top Dresser.....	7.41	3.00
Muriate of Potash.....	48.00
Sulphate of Potash.....	48.00
H. G. German Kainit 16 Per Cent.....	16.00
Genuine German Kainit.....	12.00

B. W. Brorley, Mooresville, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Red	10.00	2.47	3.00
Leo	8.00	2.47	3.00
16 Per Cent Dried Blood.....	....	13.17	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Columbia Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Raw Bone Meal.....Total	20.25	3.71	....
Columbia High Grade 16 Per Cent Acid Phosphate	16.00	....	....
Columbia 14 Per Cent Acid Phosphate.....	14.00	....	....
Columbia Dissolved Bone.....	13.00	....	....
Columbia Acid Phosphate.....	12.00	....	....
Columbia 11 and 5 Bone and Potash Mixture.....	11.00	....	5.00
Columbia 10 and 5 Bone and Potash Mixture.....	10.00	....	5.00
Columbia 10 and 4 Bone and Potash Mixture.....	10.00	....	4.00
Columbia Bone and Potash for Grain.....	10.00	....	3.00
Columbia Bone and Potash Mixture.....	10.00	....	2.00
McRae's Special	9.00	4.12	7.00
Columbia C. S. M. Special.....	9.00	2.27	2.00
Roanoke Ammoniated Guano.....	9.00	1.65	3.00
Carolina Soluble Guano.....	9.00	1.65	1.00
McRae's High Grade Guano.....	8.00	3.30	7.00
Pelican Ammoniated Guano.....	8.00	3.30	4.00
Columbia Special Truck Guano.....	8.00	3.30	4.00
Trojan Tobacco Guano.....	8.00	3.30	4.00
Columbia Special 4-8-3.....	8.00	3.30	3.00
Hayes' Special	8.00	3.30	3.00
Olympia Cotton Guano.....	8.00	2.47	3.00
Hyco Tobacco Guano.....	8.00	2.47	3.00
Our Best Meal Guano.....	8.00	2.47	3.00
Royal Tobacco Fertilizer.....	8.00	2.06	3.00
Columbia Special Guano.....	8.00	2.06	2.00
Columbia Soluble for Tobacco.....	8.00	1.65	2.00
Columbia Special Wheat Fertilizer.....	8.00	1.65	2.00
Columbia Soluble Guano.....	8.00	1.65	2.00
Spinola Peanut Grower.....	8.00	1.02	4.00
Columbia 8 and 4 Bone and Potash Mixture..	8.00	....	4.00
Columbia Special 7 Per Cent Truck Guano...	7.00	5.77	7.00
Columbia Potato Guano.....	7.00	4.12	5.00
Crown Brand Peanut Guano.....	7.00	....	5.00
Crew's Special	5.85	4.49	10.00
Columbia Side Dresser.....	4.00	8.22	4.00
Columbia Special Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	15.22	....
Columbia Top Dresser.....	....	7.42	3.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Cumberland Bone and Phosphate Co., Portland, Me., and Charleston, S. C.—</i>			
Standard Cumberland Bone and Superphosphate of Lime.....	9.00	1.85	1.00
<i>The Coc-Mortimer Co., Charleston, S. C.—</i>			
Thomas Phosphate (Basic Slag).....	19.00	....	....
Thomas Phosphate (Basic Slag).....	17.50	....	....
Thomas Phosphate (Basic Slag).....	17.00	....	....
Imported Ground Fish Guano, No. 2.....	6.80	9.46	....
Imported Ground Fish, No. 1.....	6.80	8.23	....
High Grade Tankage.....	6.80	8.22	....
High Grade Tankage.....	6.80	7.45	....
Imported Fish Guano.....Total	6.20	5.60	....
High Grade Tankage.....	5.00	8.23	....
High Grade Tankage.....Total	5.00	7.61	....
Imported Fish Guano.....Total	4.48	5.77	....
Imported Fish Guano.....Total	2.00	9.87	....
Nitrate of Soda.....	....	14.76	....
Dried Blood, No. 2.....	....	13.37	....
Nitrate of Potash.....	....	12.30	44.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00
<i>Cooper Guano Co., Wilmington, N. C.—</i>			
Cooper's 16 Per Cent Acid Phosphate.....	16.00	....	....
Cooper's 14 Per Cent Acid Phosphate.....	14.00	....	....
Cooper's Grain Producer.....	10.00	....	4.00
Cooper's Grain Grower.....	10.00	....	2.00
Cooper's Reorder.....	8.85	1.65	2.00
Cooper's Kite.....	8.00	4.11	7.00
Cooper's Helmet.....	8.00	3.29	4.00
Cooper's Horta.....	8.00	3.29	4.00
Cooper's Chadbourne Trucker.....	8.00	2.47	10.00
Cooper's Henox.....	8.00	2.47	3.00
Cooper's Sunset C. S. M.....	8.00	2.47	3.00
Cooper's Clifford.....	8.00	2.47	3.00
Cooper's Swamp Fox.....	8.00	2.47	2.50
Cooper's Bunker Hill.....	8.00	2.06	3.00
Cooper's Crusoe.....	8.00	2.06	2.00
Cooper's Potato.....	8.00	1.65	10.00
Cooper's Reward.....	8.00	1.65	2.00
Cooper's Waccamaw.....	8.00	1.65	2.00
Cooper's Genuine Eagle Island.....	8.00	1.65	2.00
Cooper's Sterling Complete.....	8.00	1.65	2.00
Cooper's Peanut Bouncer.....	8.00	.83	4.00
Cooper's Finis.....	7.00	4.11	5.00
Nitrate of Soda.....	....	14.82	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
<i>Craven Chemical Co., New Bern, N. C.—</i>			
Panama 16 Per Cent Acid Phosphate.....	16.00	....	....
Jewel Acid Phosphate.....	14.00	....	....
Trent Bone and Potash.....	10.00	....	2.00
Halifax Guano.....	9.00	2.47	3.00
Prolix 9-2-3 Special Guano.....	9.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Hanover Standard Guano.....	8.00	3.29	4.00
Duplin Tobacco Guano.....	8.00	2.17	3.00
Gaston High Grade Fertilizer.....	8.00	2.47	3.00
C. E. Foy High Grade Guano.....	8.00	2.47	3.00
Marvel Great Crop Grower.....	8.00	2.06	3.00
Elite Cotton Guano.....	8.00	1.65	2.00
Pantego Potato Guano.....	7.00	4.12	7.00
Neuse Truck Grower.....	6.00	4.94	6.00
Craven Chemical Co.'s Truck Guano, 5-10-21 $\frac{1}{2}$	5.00	8.24	2.50
Genuine German Kainit.....	....	....	12.00

William H. Camp, Petersburg, Va.—

Bone Meal	Total	22.50	3.80	....
Camp's Acid Phosphate.....		16.00	....	....
Camp's Acid Phosphate.....		14.00	....	....
Camp's Shepherd Brand Bone and Potash....		10.00	....	4.00
Camp's Bone and Potash.....		10.00	....	2.00
Camp's Yellow Head Chemicals.....		8.00	2.87	7.50
Camp's Lion and Monkey for Tobacco.....		8.00	2.46	3.00
Camp's Red Head Chemicals.....		8.00	2.25	2.00
Camp's Lion and Monkey.....		8.00	1.65	2.00
Camp's Green Head Chemicals, Irish Potato..		7.00	6.15	10.00
Camp's Above All.....		6.00	5.75	5.00
Nitrate of Soda.....		....	14.75	....
German Kainit .....		....	....	12.00

Clayton Oil Mill, Clayton, N. C.—

C. O. M. 16 Per Cent Acid Phosphate.....	16.00	....	....
C. O. M. 14 Per Cent Acid Phosphate.....	14.00	....	....
C. O. M. High Grade Bone and Potash.....	12.00	....	5.00
C. O. M. Wheat Compound.....	10.00	2.05	4.50
C. O. M. Special Corn Mixture.....	10.00	....	5.00
C. O. M. Bone and Potash.....	10.00	....	4.00
C. W. H. Special.....	8.00	4.10	5.00
Clayton Guano	8.00	2.47	3.00
Clayton Special Tobacco Grower.....	8.00	2.47	3.00
Planters' Favorite	8.00	2.47	3.00
Cotton Queen	8.00	1.65	2.00
Summer Queen	8.00	1.65	2.00
C. O. M. Top Dresser.....	2.00	6.56	1.50
H. and W. D. Climax Top Dresser.....	....	12.70	....
Perfection Top Dresser.....	....	9.85	4.00
C. O. M. German Kainit.....	....	....	12.00

The Chesapeake Chemical Co., Baltimore, Md.—

C. C. C.'s Rapid Trucker.....	8.00	3.28	7.00
C. C. C.'s Pure German Kainit.....	....	....	12.40

Cowell, Swan & McCotter Co., Bayboro, N. C.—

Bone Phosphate	14.00	....	....
Standard Cotton Grower.....	8.00	3.30	3.00
Champion Guano	8.00	2.47	3.00
Cowell's Great Tobacco Grower.....	8.00	2.47	3.00
Quick Grower Guano.....	8.00	2.06	3.00
Rust Proof Cotton Guano.....	8.00	1.65	3.00
Crop Guano	8.00	1.65	2.00
Great Cabbage and Potato Guano.....	7.00	5.77	7.00
Oriental Trucker	7.00	4.12	8.00
Aurora Trucker	7.00	4.12	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
High Grade Truck Guano.....	7.00	4.12	5.00
Potato Favorite Guano.....	7.00	3.30	7.00
Cabbage Guano	5.00	8.25	2.50
German Kainit .....	....	....	12.00

Congaree Fertilizer Co., Charleston, S. C.—

Congaree H. G. Acid Phosphate (3).....	16.00
Congaree H. G. Acid Phosphate.....	14.00	....	....
Congaree H. G. Acid Phosphate.....	13.00	....	....
Congaree Superphosphate and Potash.....	11.00	....	1.00
Congaree Superphosphate and Potash.....	10.00	....	4.00
Congaree Superphosphate and Potash.....	10.00	....	3.00
Congaree Superphosphate and Potash.....	10.00	....	2.00
Congaree Ammoniated Bone Superphosphate.	9.00	2.26	2.00
Congaree Prize Winner.....	9.00	1.65	2.00
Congaree Double Ammoniated.....	8.00	6.78	4.00
Congaree Early Trucker.....	8.00	3.30	8.00
Congaree Early Boll.....	8.00	3.30	6.00
Congaree H. G. Fish Guano.....	8.00	3.30	4.00
Congaree Debt Payer.....	8.00	3.00	4.00
Congaree Tobacco Grower.....	8.00	3.30	4.00
Congaree H. G. Fish Guano.....	8.00	2.47	3.00
Congaree Soil Builder.....	8.00	2.47	3.00
Congaree Special Meal Mixture.....	8.00	2.47	3.00
Congaree Tobacco Grower.....	8.00	2.47	3.00
Congaree H. G. Corn Guano.....	8.00	2.47	2.00
Congaree Farmers' Choice.....	8.00	2.06	2.00
North Carolina Standard.....	8.00	1.64	2.00
Congaree Superphosphate and Potash.....	8.00	....	4.00
Truck Farmers' Choice.....	7.00	4.13	7.00
Congaree Top Dresser.....	4.00	6.18	2.50
Nitrate of Soda.....	....	14.79	....
Congaree Ash Element.....	....	8.23	6.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Chickamauga Fertilizer Works, Atlanta, Ga.—

Chickamauga High Grade Dissolved Bone, No. 16.....	16.00
Chickamauga High Grade Dissolved Bone....	14.00	....	....
Chickamauga 13-4	13.00	....	4.00
Chickamauga Potash Special.....	12.00	....	4.00
Chickamauga Potash Special.....	12.00	....	2.00
Chickamauga Dissolved Bone.....	12.00	....	....
Chickamauga Very Best.....	10.00	3.30	4.00
Ben Hur H. G. Guano.....	10.00	2.47	3.00
Special Potato Compound.....	10.00	1.65	4.00
Special Wheat Compound.....	10.00	1.65	4.00
Special Vegetable Compound.....	10.00	1.65	4.00
Special Corn Compound.....	10.00	1.65	4.00
Chickamauga High Grade Fertilizer.....	10.00	1.65	2.00
Chickamauga High Grade Plant Food.....	10.00	1.65	2.00
Chickamauga Fish Scrap Guano.....	10.00	1.65	2.00
Chickamauga Wheat Special.....	10.00	.82	3.00
Chickamauga Corn Special.....	10.00	.82	3.00
Chickamauga Cotton Special.....	10.00	.82	3.00
Old Glory Mixture.....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower, No. 8.	10.00	....	8.00
Chickamauga Wheat and Corn Grower, No. 6.	10.00	....	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Chickamauga Wheat and Corn Grower, No. 5.	10.00	....	5.00
Chickamauga Wheat and Corn Grower.....	10.00	....	4.00
Chickamauga Bone and Potash.....	10.00	....	2.00
Chickamauga Blood, Bone and Tankage Guano	9.00	.82	2.00
Special Potato Grower.....	8.00	1.65	6.00
Special Wheat Grower.....	8.00	1.65	6.00
Special Vegetable Grower.....	8.00	1.65	6.00
Special Corn Grower.....	8.00	1.65	6.00
Chickamauga Complete Fertilizer.....	8.00	1.65	2.00
Chickamauga Standard Corn Grower.....	8.00	1.65	2.00
Chickamauga Standard Wheat Grower.....	8.00	1.65	2.00
Georgia Home Guano.....	8.00	1.65	2.00
No. 3 Bone, Tankage and Potash Mixture....	8.00	.82	3.00
Chickamauga Alkaline Bone, No. 6.....	8.00	....	6.00
Chickamauga Alkaline Bone, No. 5.....	8.00	....	5.00
Chickamauga Alkaline Bone.....	8.00	....	4.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	50.00

Canton Fertilizer Co., Canton, Ga.—

High Grade Acid Phosphate.....	16.00	....	....
Acid Phosphate	14.00	....	....
R. T. Jones Extra H. G.....	10.00	2.47	3.00
Elberta	10.00	2.06	7.00
North Georgia High Grade.....	10.00	2.06	3.00
Southern King High Grade.....	10.00	1.65	2.00
Fish Ammoniated High Grade.....	10.00	1.65	2.00
Orange High Grade.....	10.00	1.65	2.00
Jomco High Grade.....	10.00	1.65	2.00
Quickstep Wheat and Grain Grower.....	10.00	.82	3.00
Special Potash Mixture.....	10.00	....	4.00
Fish Ammoniated Standard.....	8.00	1.65	2.00
Jomco Standard Grade.....	8.00	1.65	2.00
Southern King Standard Grade.....	8.00	1.65	2.00
Dissolved Bone and Potash.....	8.00	....	4.00

The Chesapeake Chemical Co., Baltimore, Md.—

C. C. Co.'s Dissolved Phosphate.....	14.00	....	....
C. C. Co.'s Reliable Phosphate.....	10.00	....	4.00
C. C. Co.'s Celebrated Mixture.....	10.00	....	2.00
C. C. Co.'s High Grade Guano.....	8.00	3.28	4.00
C. C. Co.'s Excelsior Fertilizer.....	8.00	2.46	4.00
C. C. Co.'s Fish Guano.....	8.00	2.46	3.00
C. C. Co.'s Ammoniated Phosphate.....	8.00	1.64	3.00
C. C. Co.'s National Crop Grower.....	8.00	1.64	2.00
C. C. Co.'s Keystone Phosphate.....	7.00	3.28	5.00
C. C. Co.'s Potato Compound.....	6.00	4.10	5.00
C. C. Co.'s Prolific Top Dresser.....	....	7.51	3.50

*Caraleigh Phosphate and Fertilizer Works,
Raleigh, N. C.—*

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....Total	16.00	....	....
Climax Dissolved Bone.....	14.00	....	....
Sterling Acid Phosphate.....	13.00	....	....
Stable Acid Phosphate.....	12.00	....	....
Horne & Son's High Grade Bone and Potash.	11.00	....	5.00
Special Bone and Potash Mixture.....	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Morris & Scarborough's Special Bone and Potash.	10.00	....	3.00
Electric Bone and Potash Mixture.....	10.00	....	2.00
Pacific Tobacco and Cotton Grower.....	9.00	2.26	2.00
Rhamkatté Special Tobacco Guano.....	8.00	3.30	6.00
Special 8-4-4	8.00	3.30	4.00
Horne's Best	8.00	2.47	3.00
Eclipse Ammoniated Guano.....	8.00	2.47	3.00
Planters' Pride	8.00	2.06	3.00
Caraleigh Special Tobacco Guano.....	8.00	2.06	3.00
Eli Ammoniated Fertilizer.....	8.00	1.65	2.00
Crown Ammoniated Guano.....	8.00	1.65	2.00
Comet Guano	8.00	.82	3.00
Buncombe Wheat Grower.....	8.00	....	4.00
Caraleigh Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Crown Fertilizer Co., Baltimore, Md.—

Crown 4-8-4	8.00	3.29	4.00
Crown 3-8-3	8.00	2.47	3.00
Crown 2½-8-3	8.00	2.06	3.00
Crown 2-8-2	8.00	1.65	2.00
Crown Top Dressing.....	....	7.41	3.00

W. B. Cooper, Wilmington, N. C.—

Nitrate of Soda.....	....	14.82	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00

Contentnea Guano Co., Wilson, N. C.—

High Grade 16 Per Cent Acid.....	16.00	....	....
Contentnea 14 Per Cent Acid.....	14.00	....	....
Special Formula Fertilizer.....	12.00	1.65	4.00
Special Formula	10.00	4.10	6.00
"Corn Club" Special.....	10.00	.82	5.00
Bone and Potash Mixture.....	10.00	....	5.00
Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Howard and Williams Cotton Special.....	9.00	3.30	6.00
Carr's Special for Cotton.....	9.00	2.47	2.75
Contentnea Cotton Formula.....	9.00	2.25	2.00
16 Per Cent German Kainit.....	....	....	16.00
8-4½-7 for Tobacco.....	8.00	3.70	7.00
8-4½-7 for Cotton.....	8.00	3.70	7.00
Whitehead Farm Cotton Grower.....	8.00	3.30	5.00
Climax High Grade.....	8.00	3.29	4.00
High Grade Tobacco Grower.....	8.00	2.88	5.00
Special for Tobacco.....	8.00	2.87	10.00
Carr's Special for Tobacco.....	8.00	2.67	6.00
Government Formula, No. 1.....	8.00	2.47	10.00
Government Formula, No. 2.....	8.00	2.47	8.00
Victor Fertilizer for Tobacco.....	8.00	2.47	5.00
Tobacco Growers' Special Formula.....	8.00	2.47	4.00
Pick Leaf Tobacco Fertilizer.....	8.00	2.47	3.00
Top Notch	8.00	2.47	3.00
Contentnea Cotton Grower.....	8.00	2.47	2.50
Tyson's Cotton Special.....	8.00	2.05	4.00
Contentnea Tobacco Special.....	8.00	2.05	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Blood and Bone Cotton Compound.....	8.00	1.65	2.00
Bragg Corn Fertilizer.....	8.00	.82	5.00
Contentnea Corn Special.....	5.00	1.65	5.00
High Grade Top Dresser.....	4.00	8.24	4.00
Contentnea Top Dresser.....	3.60	8.23	5.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit.....	....	....	12.00

J. W. Carter, Marton, N. C.—

Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	12.00

Cooper Guano Co., Wilmington, N. C.—

Cooper's Bald Head Island.....	8.00	1.65	2.00
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C. P. Dey, Beaufort, N. C.—

Ground Fish Scrap.....	6.00	9.37
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Dixie Guano Co., Savannah, Ga.—

Phosphoric Acid.....	16.00
Phosphoric Acid.....	14.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	3.30	4.00
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.85	2.75
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
High Grade.....	10.00	1.64	2.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Bone and Potash.....	10.00	....	2.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	3.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	9.00	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
Standard Grade.....	8.75	1.64	2.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	3.30	4.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
High Grade.....	8.00	2.47	3.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00
Corn Guano.....	8.00	1.64	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00
Standard Grade.....	8.00	1.64	2.00

Dixie Guano Co., Durham, N. C.—

Dixie 16 Per Cent Acid Phosphate.....	16.00
Dixie 14 Per Cent Acid Phosphate.....	14.00	....	....
Dixie Champion for Wheat and Corn.....	10.50	....	1.50
Jeff Davis Special.....	9.00	2.26	2.00
Dixie Star Ammoniated.....	9.00	1.65	1.00
Dixie Corn Fertilizer.....	9.00	.82	3.00
Radium Brand Guano.....	8.00	3.28	5.00
Dixie Tobacco Fertilizer.....	8.00	2.46	3.00
Carolina Special Ammoniated.....	8.00	2.46	3.00
Sulky Plow Brand Guano.....	8.00	2.46	2.00
Battle's Blood and Bone Fertilizer.....	8.00	2.05	3.00
Niagara Soluble Bone.....	8.00	2.05	2.00
Dixie Cotton Fertilizer.....	8.00	1.65	2.00
Old Plantation Superphosphate.....	8.00	1.65	2.00

Etiwan Fertilizer Co., Charleston, S. C.—

Etiwan 16 Per Cent Acid Phosphate.....	16.00	....	....
Etiwan High Grade Acid Phosphate.....	14.00	....	....
Etiwan Dissolved Bone.....	13.00	....	....
Diamond Soluble Bone.....	13.00	....	....
Etiwan Acid Phosphate with Potash.....	11.00	....	1.00
Plow Brand Acid Phosphate with Potash.....	11.00	....	1.00
Etiwan Potash Bone.....	10.00	....	4.00
Etiwan Soluble Bone with Potash.....	10.00	....	3.00
Diamond Soluble Bone with Potash.....	10.00	....	2.00
NN Acid Phosphate with Potash.....	10.00	....	2.00
Etiwan Blood and Bone Guano.....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate.....	9.00	2.06	1.00
Etiwan 9-2-3 Per Cent Ammoniated Fertilizer.	9.00	1.65	3.00
Plow Brand Ammoniated Dissolved Bone.....	8.85	1.65	2.00
Etiwan Superior Cotton Fertilizer.....	8.00	3.00	6.00
Etiwan Special Cotton Fertilizer.....	8.00	3.30	4.00
Plow Brand Special Tobacco Fertilizer.....	8.00	3.30	4.00
Etiwan Cotton Compound.....	8.00	2.47	3.00
Etiwan High Grade Cotton Fertilizer.....	8.00	2.47	2.00
Etiwan Ammoniated Fertilizer.....	8.00	1.65	2.00
Plow Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Etiwan Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	14.82	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Elmore Gin and Fertilizer Co., Elmore Siding, N. C.—

Elmore Cantaloupe Special.....	8.00	4.00	7.00
Elmore Standard Cotton Fertilizer.....	8.00	3.00	3.00
Elmore X Fertilizer.....	8.00	2.60	2.70

Eastern Cotton Oil Co., Hertford, N. C.—

Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
"Ten-One-Four for Peanuts".....	10.00	.83	4.00
Currituck Special for Yellow Sweets.....	8.00	3.29	6.00
Mat White Special.....	8.00	3.29	4.00
Htgrows Currituck Yellows.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Rain-proof Cotton Grower.....	8.00	2.47	3.00
Fish and Blood Mixture.....	8.00	1.65	2.00
Perquimans Favorite	8.00	1.65	2.00
Early Bird	7.00	4.12	5.00
Hertford Truck Grower.....	6.00	5.77	5.00
Tankage and Fish Substitute, Peruvian Guano for Truck	6.00	4.12	7.00
Nun-Such Potato Grower.....	6.00	4.12	7.00
Sulphate Ammonia .....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Dried Fish .....	....	9.07	....
Fish Scrap .....	....	8.07	....
Muriate of Potash.....	....	....	49.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

The Eureka Fertilizer Co., Perryville, Md.—

Camden Special	8.00	2.05	3.00
High Grade Trucker.....	8.00	1.64	10.00
Farmers' Favorite	8.00	1.64	2.00
White Potato Special.....	6.00	4.11	7.00

Elba Manufacturing Co., Maxton, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Elba Melon Grower.....	8.00	4.12	7.00
Elba Superior Fertilizer.....	8.00	3.30	4.00
Elba High Grade Fertilizer.....	8.00	3.30	4.00
Elba Gold Seal Fertilizer.....	8.00	2.47	3.00
Elba Champion Fertilizer.....	8.00	2.47	3.00
Elba Uncle Tom Fertilizer.....	8.00	2.47	3.00
Elba Standard Fertilizer.....	8.00	1.65	2.00
Elba Hornets' Nest Fertilizer.....	6.00	5.75	5.00
Elba Jacks Special.....	4.00	8.25	4.00
Nitrate of Soda.....	....	14.82	....
Elba Top Dresser.....	....	7.42	3.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Farmers' Coöperative Guano Co., Blackstone, Va.—

Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Bone and Potash Compound 10-4.....	10.00	4.00	....
Jericho	10.00	1.02	....
Walk Over	9.00	1.02	1.00
Virginian	8.00	3.29	2.00
Free State Official.....	8.00	2.58	3.00
McHerrin Special	8.00	2.47	3.00
Nottoway Special	8.00	2.47	2.00
Pope's Peerless	8.00	1.64	3.00
Paul Jones	8.00	1.64	2.00
Farmers' Common Sense.....	8.00	1.23	3.00

Farmers Fertilizer Co., Spartanburg, S. C.—

Phosphoric Acid	16.00	....	....
Phosphoric Acid	14.00	....	....
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Blood and Bone.....	9.00	1.64	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Beats All 9-2-2.....	9.00	1.64	2.00
Standard	8.75	1.64	2.00
Blood, Bone and Potash.....	8.75	1.64	2.00
Farmer's Favorite H. G. Fertilizer.....	8.00	2.47	3.00
Special Corn Fertilizer.....	8.00	1.64	4.00
Standard Grade Fertilizer.....	8.00	1.64	4.00
Standard Grade	8.00	1.64	2.00

Farmers Guano Co., Raleigh, N. C.—

Raw Bone Meal.....Total	26.00	5.15	....
Raw Bone Meal.....Total	22.00	3.70	....
16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Farmers Acid Phosphate.....	13.00	....	....
Special Bone and Potash Mixture.....	10.00	....	4.00
Century Bone and Potash Mixture.....	10.00	....	2.00
Farmers Blood and Bone.....	8.00	3.29	4.00
Money Point Guano.....	8.00	2.47	3.00
Golden Grade Guano.....	8.00	2.47	3.00
Big Crop Guano.....	8.00	2.06	3.00
Toco Tobacco Guano.....	8.00	2.06	3.00
State Standard Guano.....	8.00	1.65	2.00
Special Bone and Potash.....	8.00	....	4.00
Farmers Formula.....	7.00	2.47	3.25
Farmers Top Dresser.....	3.00	8.24	4.00
Nitrate of Soda.....	....	15.65	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Floradora Guano Co., Laurinburg, N. C.—

Humus	10.00	3.29	5.00
Rocky Ford	10.00	2.47	7.00
North Robeson Special.....	9.00	1.65	4.00
Florena	8.00	3.29	4.00
Floradora	8.00	3.29	4.00
Oceola	8.00	2.47	3.00
Rob Roy	8.00	2.47	3.00
Red Raven	8.00	1.65	3.00
Bostick's High Grade.....	7.00	3.29	5.00
Scotland Special	6.40	2.13	3.00

Farmville Oil and Fertilizer Co., Farmville, N. C.—

XXX High Grade Acid Phosphate.....	18.00	....	....
XX High Grade Acid Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
FFF Bone and Potash.....	12.00	....	4.00
Farmville High Grade (C. S. M.).....	10.00	2.47	4.00
Davis's Corn Grower.....	10.00	.82	5.00
Pitt County Corn Grower.....	10.00	.82	4.00
Farmville's Favorite Fertilizer.....	9.00	2.90	5.00
Big Leaf (Tobacco Grower).....	9.00	2.88	4.00
Greene County Special (for tobacco).....	9.00	2.67	5.00
Willow Green (Cotton Grower).....	9.00	2.26	2.00
Scientific Cotton Grower.....	9.00	2.26	2.00
Specific Cotton Grower.....	9.00	2.26	2.00
East Carolina Cotton Grower.....	9.00	2.25	2.00
Davis's Special Guano.....	8.00	3.70	7.00
Carolina Chief	8.00	3.30	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Lang's Favorite	8.00	3.30	4.00
Farmville Special	8.00	3.30	4.00
Turnage's Fish Scrap Mixture.....	8.00	3.30	4.00
Harris Bright Leaf Tobacco Grower.....	8.00	3.30	4.00
Pride of Farmville.....	8.00	3.29	3.00
Uncle Sam's Tobacco Grower.....	8.00	3.29	3.00
Obelisk	8.00	3.00	4.00
Pride of Pitt.....	8.00	2.47	4.00
Harriss's Special Tobacco Grower.....	8.00	2.17	3.00
Turnage's Fish Scrap Mixture.....	8.00	2.47	3.00
Congo	8.00	2.47	3.00
Pride of Grimmersburg.....	8.00	2.47	3.00
Davis's High Grade Tobacco Manure.....	8.00	2.47	3.00
Marlboro Tobacco Grower.....	8.00	2.47	3.00
Golden Crown	8.00	2.47	3.00
Marlboro Cotton Grower (C. S. M.).....	8.00	2.47	3.00
Chamblee & Sons' Special.....	8.00	2.26	2.00
Pitt County Cotton Grower.....	8.00	2.25	4.50
Perfect Tobacco Guano.....	8.00	2.06	3.00
Pollard's Special Formula.....	8.00	2.05	5.00
Contentnea Special	8.00	2.05	3.00
Perfect Tobacco Guano.....	8.00	2.05	3.00
Cotton King	8.00	2.00	4.00
Davis's Cotton Grower.....	8.00	1.65	2.00
Carolina Standard	8.00	1.65	2.00
Farmville Standard (C. S. M.).....	8.00	1.65	2.00
Farmville's Bone Mixture.....	8.00	1.65	2.00
Second Application (for cotton).....	6.00	4.10	4.00
Lang's High Grade Tobacco Manure.....	6.00	2.88	6.00
Evergreen Top Dresser.....	4.00	8.24	4.00
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00

Fremont Oil Mills, Fremont, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Fremont High Grade Bone and Potash.....	10.00	....	4.00
Fremont Oil Mill Co.'s Bone and Potash.....	10.00	....	2.00
Carolina C. S. M. Compound.....	9.00	2.26	2.00
Fremont High Grade Guano.....	8.00	3.29	4.00
Fremont Oil Mill Co.'s Special Tobacco.....	8.00	2.47	5.00
Fremont Tobacco Guano.....	8.00	2.47	5.00
Fremont Standard Fertilizer.....	8.00	2.47	3.00
Wayne County Standard.....	8.00	2.47	3.00
Nahunta Special	8.00	2.47	3.00
Square Deal	8.00	2.05	3.00
Up-to-date	8.00	1.65	2.00
Home Run	8.00	1.65	2.00
F. O. M. Co. Top Dresser.....	3.00	7.40	5.00
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Farmers Cotton Oil Co., Wilson, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
Bonum Acid Phosphate.....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Avail.	Nitrogen.	Potash.
Contentnea Acid Phosphate.....	13.00	....	....
Washington's Corn Mixture Guano.....	10.00	.82	5.00
Xtra Good Bone and Potash.....	10.00	....	2.00
Dean's Special Guano.....	8.00	3.70	7.00
Regal Tobacco Guano.....	8.00	2.88	5.00
Newsome's Tobacco Special.....	8.00	2.47	4.00
J. D. Farrier's Special Guano.....	8.00	2.47	3.00
Graves' Cotton Grower Guano.....	8.00	2.47	3.00
Golden Gem Guano.....	8.00	2.47	3.00
Wilson High Grade Guano.....	8.00	2.27	2.00
Planters' Friend Guano.....	8.00	2.06	3.00
Carolina Choice Tobacco Guano.....	8.00	2.06	3.00
Crop King Guano.....	8.00	1.65	2.00
Farmers' Special Guano.....	8.00	1.65	2.00
Rogers' Truck Grower.....	7.00	5.76	7.00
Wilson Top Dresser.....	2.00	9.05	4.00
Perfect Top Dresser.....	2.00	8.23	5.00
Sulphate of Ammonia.....	....	20.57	....
Nitrate of Soda.....	....	15.63	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
German Kainit.....	....	....	12.00

*Franklin Cotton Oil and Fertilizer Co., Inc.,
Franklin, Va.—*

Pretlow & Co.'s H. G. Acid Phosphate.....	16.00	....	....
Pretlow & Co.'s H. G. Truck Fertilizer.....	8.00	4.12	5.00
Pretlow & Co.'s Cotton-seed Meal Mixture....	8.00	2.47	3.00
Pretlow & Co.'s Champion Guano.....	8.00	1.65	2.00
Pretlow & Co.'s Peanut Grower.....	8.00	1.00	4.00
Pretlow & Co.'s H. G. 7 Per Cent Guano.....	7.00	5.76	7.00
Pretlow & Co.'s Gennine German Kainit.....	12.00

N. G. Granby Co., Elizabeth City, N. C.—

Acid Phosphate.....	16.00
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Griffith & Boyd Co., Baltimore, Md.—

High Grade Acid Phosphate.....	16.00
Growers' Favorite.....	8.00	3.29	4.00
Seven Per Cent Guano.....	5.00	6.77	5.00
Nitrate of Soda.....	....	15.66	....

Germofert Manufacturing Co., Charleston, S. C.—

Grain Fertilizer.....	5.00	.82	6.00
Fruit and Flower Fertilizer.....	2.00	3.29	6.00

Georgia Chemical Works, Augusta, Ga.—

High Grade Dissolved Bone Phosphate.....	16.00	....	....
Extra Dissolved Bone Phosphate.....	14.00	....	....
Dissolved Bone Phosphate.....	13.00	....	....
12 Per Cent Dissolved Bone Phosphate.....	12.00	....	....
High Grade XX Acid Phosphate with Potash.	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Gem Crop Grower.....	9.00	1.65	2.00
Cardinal High Grade.....	8.00	3.29	4.00
Intensive Formula.....	8.00	2.47	3.00
Three Oaks High Grade Guano.....	8.00	2.47	2.00
Georgia Formula.....	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
XXX Meal Mixture.....	8.00	1.65	2.00
Acid Phosphate with 4 Per Cent Potash.....	8.00	....	4.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

German Kali Works, Baltimore, Md.—

Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

R. C. Gilliam, Norfolk, Va.—

Gilliam's Special 5 Per Cent Guano.....	7.00	4.11	5.00
Gilliam's Special Potato Guano.....	6.00	5.76	6.00
Gilliam's 7 Per Cent Potato Guano.....	6.00	5.76	5.00

Hollingshurst & Co., New York City, N. Y.—

Bone Meal	Total	22.88	2.46
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Home Fertilizer and Chemical Co., Baltimore, Md.—

Champion Dissolved Phosphate.....	16.00
Boykin's High Grade Acid Phosphate.....	14.00	....	....
Boykin's Dissolved Animal Bone.....	12.00	1.65	....
Gilt Edge Crop Grower.....	10.00	1.65	4.00
Home Bone and Potash.....	10.00	....	5.00
Boykin's Alkaline Bone.....	10.00	....	2.00
Home Ammoniated Bone.....	9.00	1.65	3.00
Home B. G. Ammoniated Compound.....	9.00	.82	5.00
Everybody's Fertilizer	9.00	.82	2.00
Home Standard Guano.....	8.00	3.29	4.00
Riosa Tobacco Compound.....	8.00	2.48	3.00
Special C. & C. Compound.....	8.00	2.48	3.00
Yancey's Formula for Yellow Leaf Tobacco...	8.00	2.48	2.00
Phoenix Crop Grower.....	8.00	2.48	2.00
Home Potato Special.....	8.00	1.65	10.00
Matchless Guano	8.00	1.65	4.00
Boykin's Cereal Fertilizer.....	8.00	1.65	2.00
Ammoniated Bone Manure.....	7.00	1.65	5.00
Farmers' Choice	7.00	.82	4.00
Truckers' Special Compound.....	6.00	5.77	5.00
Boykin's Vegetable Fertilizer.....	6.00	4.12	6.00
Boykin's Home Potato Grower.....	6.00	3.30	4.00
Cerealite Top Dresser.....	....	7.43	3.00
Home Fertilizer .....	....	5.77	7.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

Hadley, Harris & Co., Wilson, N. C.—

Hadley's Special S-4½-7 Mixture.....	8.00	3.70	7.00
Hadley's Tobacco and Cotton Special.....	8.00	2.47	5.00
Golden Weed Tobacco Grower.....	8.00	2.47	3.00
Hadley Boss Guano.....	8.00	2.26	2.50
Daisy Fish Mixture.....	8.00	1.65	2.00
Top Dressing	2.00	8.23	5.00
Nitrate of Soda.....	....	15.60	....
German Kainit .....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Hampton Guano Co., Norfolk, Va.—</i>			
Pure Ground Bone.....Total	20.00	3.70	....
Supreme Acid Phosphate.....	16.00	....	....
Hampton Acid Phosphate.....	14.00	....	....
Hampton Bone and Potash Mixture.....	11.00	....	2.00
Hampton Crop Grower.....	10.00	....	4.00
Damntless Potash Mixture.....	10.00	....	2.00
Arlington Animal Bone Fertilizer.....	9.00	1.85	4.00
Alpha Crop Grower.....	8.50	2.06	2.50
Little's Favorite Crop Grower.....	8.00	3.29	4.00
Hampton Tobacco Guano.....	8.00	2.47	3.00
P. P. P. (Princess Prolific Producer).....	8.00	2.47	3.00
Extra Tobacco Guano.....	8.00	1.65	2.00
Shirley Superphosphate.....	8.00	1.65	2.00
Hampton Special Grain and Peanut Fertilizer.	8.00	1.00	4.00
Excelsior Bone and Potash.....	8.00	....	4.00
Reliance Truck Guano.....	7.00	4.11	5.00
Virginia Truck Grower.....	6.00	5.76	5.00
Hampton Top Dresser.....	4.00	8.23	2.00
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

S. B. Harrell & Co., Inc., Norfolk, Va.—

Harrell's Acid Phosphate.....	14.00	....	....
Harrell's Eclipse.....	9.00	2.26	2.00
Harrell's Champion Cotton and Peanut Grower.....	8.00	1.65	2.00
Harrell's Truck Guano.....	6.00	5.76	5.00

Hartsville Fertilizer Co., Hartsville, S. C.—

Coker's Special for Cotton.....	10.00	3.29	3.00
Hartsville Cotton Grower.....	8.00	3.29	4.00

M. P. Hubbard & Co., Baltimore, Md.—

Hubbard's Soluble S. C. Phosphate.....	16.00	....	....
Hubbard's Havana Special for Tobacco.....	8.00	2.48	3.00
Hubbard's Celebrated Phosphate.....	8.00	1.65	2.00
Hubbard's Maryland Special Vegetable Grower.....	7.00	4.13	5.00
Hubbard's Special Cotton and Corn Fertilizer.	7.00	1.65	5.00
Hubbard's 7 Per Cent Bermuda Guano.....	6.00	5.78	5.00
Nitrate of Soda.....	....	15.60	....
Ground Fish.....	....	8.25	....
Muriate of Potash.....	....	....	50.00

The Hubbard Fertilizer Co., Baltimore, Md.—

Gregory's 16 Per Cent Acid Phosphate.....	16.00	....	....
Hubbard's 14 Per Cent Phosphate.....	14.00	....	....
Hubbard's Special Mixture 10 and 4.....	10.00	....	4.00
Hubbard's B. and P. 10 and 2.....	10.00	....	2.00
Hubbard's Noxall.....	8.00	3.28	4.00
Hubbard's Royal Eusign.....	8.00	2.46	4.00
Hubbard's Yellow Wrapper.....	8.00	2.46	3.00
Hubbard's Fish Compound.....	8.00	1.64	3.00
Hubbard's Exchange Guano.....	8.00	1.64	2.00
Hubbard's Southern Leader.....	7.00	3.28	5.00
Hubbard's 5 Per Cent Royal Seal.....	6.00	4.10	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Hubbard's Heavy Long Leaf.....	4.00	3.28	6.00
Hubbard's New Process Top Dresser.....	....	7.51	3.50
Pure German Kainit.....	....	....	12.00
<i>L. Harvey & Son Co., Kingston, N. C.—</i>			
Nitrate of Soda.....	....	15.00	....
<i>Harby & Co., Sumter, S. C.—</i>			
Nitrate of Soda.....	....	14.85	....
Muriate of Potash.....	....	....	49.00
German Kainit .....	....	....	12.00
<i>Interstate Chemical Co., Charleston, S. C.—</i>			
Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....
Acid Phosphate with Potash.....	11.00	....	1.00
Acid Phosphate with Potash.....	10.00	....	4.00
Acid Phosphate with Potash.....	10.00	....	2.00
Complete Fertilizer	9.00	2.06	2.00
Favorite Crop Grower.....	9.00	1.65	2.00
H. G. Ammoniated Fertilizer.....	8.00	3.30	4.00
Planters' Preference Guano.....	8.00	2.49	3.00
Challenge Brand Guano.....	8.00	2.06	2.00
Ammoniated Guano	8.00	1.64	2.00
Acid Phosphate with Potash.....	8.00	....	4.00
Special High Grade Formula.....	7.00	2.47	7.00
Nitrate of Soda.....	....	18.00	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00
<i>The Imperial Co., Norfolk, Va.—</i>			
Imperial Pure Ground Bone.....Total	20.00	3.70	....
Imperial H. G. Tennessee Acid Phosphate....	16.00	....	....
Imperial High Grade Acid Phosphate.....	14.00	....	....
Imperial Catawba Wheat Grower.....	10.00	....	4.00
Imperial Carolina Wheat Mixture.....	10.00	....	3.00
Imperial Virginia Grain Mixture.....	10.00	....	2.00
Imperial Bone and Potash.....	10.00	....	2.00
Imperial Martin County Special Crop Grower.	9.00	2.26	2.00
Imperial Snowflake Cotton Grower.....	8.00	3.29	4.00
Imperial Tobacco Grower.....	8.00	3.29	4.00
Imperial X. L. O. Cotton Guano.....	8.00	2.47	3.00
Imperial Tobacco Guano	8.00	2.47	3.00
Imperial Yellow Bark Sweet Potato Guano...	8.00	2.47	3.00
Imperial E. and B. Cotton Guano.....	8.00	2.06	3.00
Imperial Bright Tobacco Guano.....	8.00	2.06	3.00
Imperial Tennessee Tobacco Guano.....	8.00	1.65	8.00
Imperial Peanut Guano	8.00	1.65	4.00
Imperial Cotton Grower	8.00	1.65	2.00
Imperial Peanut and Corn Guano.....	8.00	1.65	2.00
Imperial Champion Guano.....	8.00	1.65	2.00
Imperial Cisco Soluble Guano.....	8.00	1.65	2.00
Imperial Standard Premium.....	8.00	1.65	2.00
Imperial Fish and Bone Grain Grower.....	8.00	.82	4.00
Imperial Yadkin Wheat Grower.....	8.00	....	4.00
Imperial 7-7-7 Potato Guano.....	7.00	5.76	7.00
Imperial High Grade Irish Potato Guano.....	7.00	4.11	8.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Imperial Dawson's Cotton Grower.....	7.00	2.67	2.75
Imperial Roanoke Crop Grower.....	7.00	2.47	2.00
Imperial Asparagus Mixture	6.00	4.94	7.00
Imperial 5-6-7 Potato Guano.....	6.00	4.11	7.00
Imperial Williams' Special Potato Guano.....	6.00	4.11	5.00
Imperial Fish and Bone.....	6.00	3.29	4.00
Imperial Sweet Potato Guano.....	6.00	1.65	6.00
Imperial 10 Per Cent Guano.....	5.00	8.23	2.50
Imperial Special 7 Per Cent for Potatoes.....	5.00	5.76	5.00
Imperial Special Tobacco Guano.....	5.00	3.29	9.00
Imperial Laughinghouse Special Tobacco Guano	4.00	3.29	6.00
Imperial Conetoe Cotton Grower.....	4.00	3.29	4.00
Imperial Cubanola Tobacco Guano.....	4.00	2.47	5.00
Imperial Top Dresser for Cotton.....	2.00	8.23	....
Imperial Nitrate of Soda.....	....	15.00	....
Imperial Ground Fish Scrap.....	....	8.23	....
Imperial Animal Tankage.....	....	5.76	....
Imperial Sulphate of Potash.....	....	....	50.00
Imperial Muriate of Potash.....	....	....	49.00
Imperial Genuine German Kainit.....	....	....	12.00

Imperial Cotton Oil Co., Statesville, N. C.—

Imperial 16 Per Cent Acid Phosphate.....	16.00
Imperial High Grade Acid Phosphate.....	14.00	....	....
10-4 Bone and Potash.....	10.00	....	4.00
Imperial Bone and Potash.....	10.00	....	2.00
King Cotton	8.00	2.47	3.00
Imperial Corn Grower.....	8.00	2.47	1.50
"Grasoil"	8.00	1.65	2.00
Imperial Cotton Grower.....	8.00	1.65	2.00

J. T. John, John's Station, N. C.—

Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

N. B. Josey Guano Co., Tarboro, N. C.—

Josey's 16 Per Cent Acid Phosphate.....	16.00	....	....
Josey's 14 Per Cent Acid Phosphate.....	14.00	....	....
Josey's Bone and Potash.....	10.00	....	4.00
Josey's Truck Guano.....	8.00	4.10	5.00
Josey's 8-4-4 C. S. Meal and Fish Scrap Guano	8.00	3.30	4.00
Josey's Best C. S. Meal and Fish Scrap Guano	8.00	2.47	3.00
Josey's Tip Top C. S. Meal and Fish Scrap Tobacco Guano	8.00	2.47	3.00
Josey's Favorite C. S. Meal and Fish Scrap Guano	8.00	2.05	2.50
Josey's C. S. Meal Guano.....	8.00	1.65	2.00
Josey's Truck Guano.....	7.00	5.76	....
Josey's Peanut Guano.....	5.50	1.23	5.50
Nitrate of Soda.....	....	15.50	....
Josey's XX Top Dresser.....	....	7.40	4.00
Josey's Top Dresser.....	....	7.40	4.00
Farmers Union Top Dresser.....	....	7.40	4.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Latta Gin and Manufacturing Co., Latta, S. C.—</i>			
Latta High Grade.....	8.00	2.47	3.00
<i>Lister's Agricultural Chemical Works, Newark, N. J.—</i>			
Lister's 41½-15 Bone Meal.....Total	20.50	3.70	....
Lister's Standard Pure Bone Superphosphate of Lime	9.00	1.65	2.00
Lister's Ammoniated Dissolved Bone Phos- phate	8.00	2.06	2.00
Lister's Ammoniated Dissolved Bone Phos- phate	8.00	2.06	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
Lister's Success Fertilizer.....	8.00	1.65	2.00
Nitrate of Soda.....	....	15.00	....
<i>A. S. Lee & Sons Co., Inc., Richmond, Va.—</i>			
Thomas' Basic Slag.....Total	15.00	....	....
Lee's Corn Fertilizer.....	10.00	....	2.00
Lee's Wheat Fertilizer.....	10.00	....	2.00
Lee's Bone and Potash.....	9.00	....	4.00
Lee's Natural Tobacco Grower.....	8.00	1.65	2.00
Lee's Prepared Agricultural Lime.....	....	....	2.25
<i>Lumberton Cotton Oil and Ginning Co., Lumberton, N. C.—</i>			
Acid Phosphate	16.00	....	....
Gold Dollar	8.00	3.30	4.00
Stanby	8.00	3.30	4.00
Cottonaid	8.00	2.47	3.00
Silver Dollar	8.00	2.47	3.00
Home Run	4.00	6.58	4.00
Genuine German Kainit.....	....	....	12.00
<i>John F. McNair, Laurinburg, N. C.—</i>			
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00
<i>E. H. & J. A. Meadows Co., New Bern, N. C.—</i>			
Diamond Acid Phosphate.....	16.00	....	....
Meadows' Diamond Acid Phosphate.....	14.00	....	....
Meadows' Dissolved Bone and Potash Com- pound	10.00	....	2.00
Meadows' Lobos Guano.....	8.00	4.11	5.00
Meadows' Ideal Tobacco Guano.....	8.00	3.29	4.00
Brooks' Special Tobacco Grower.....	8.00	2.47	5.00
Parker's Special Tobacco Guano.....	8.00	2.47	4.00
Dixon's High Grade Tobacco Guano.....	8.00	2.47	3.00
Meadows' Gold Leaf Tobacco Guano.....	8.00	2.47	3.00
Meadows' Roanoke Guano.....	8.00	2.05	3.00
Meadows' All Crop Guano.....	8.00	2.05	2.50
Meadows' Cotton Guano.....	8.00	1.64	2.00
Hookerton Cotton Guano.....	8.00	1.64	2.00
Meadows' Great Cabbage Guano.....	7.00	5.76	7.00
Meadows' Great Potato Guano.....	7.00	4.11	8.00
Meadows' 10 Per Cent Guano.....	6.00	8.23	2.50
Meadows' German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Miller Fertilizer Co., Baltimore, Md.—</i>			
Ground Bone .....Total	22.90	2.47	....
Miller's 16 Per Cent Acid Phosphate.....	16.00	....	....
Miller's 14 Per Cent Acid Phosphate.....	14.00	....	....
Corn and Peanut Grower.....	10.50	....	2.25
Corn and Wheat Grower.....	10.50	....	2.25
The Miller Fertilizer Co.'s 10 and 4 Per Cent.	10.00	....	4.00
Clinch	10.00	....	2.00
Trucker	8.00	4.12	5.00
No. 1 Potato and Vegetable Grower.....	8.00	3.71	7.00
Miller's Irish Potato.....	8.00	3.29	4.00
4 Per Cent Tobacco.....	8.00	3.29	4.00
Miller's S-3-6	8.00	2.47	6.00
Standard Phosphate	8.00	2.47	3.00
Tobacco King	8.00	2.47	3.00
Standard	8.00	2.47	3.00
Miller's High Grade.....	8.00	2.06	3.00
Harmony	8.00	2.06	3.00
Special Tobacco Grower.....	8.00	1.65	4.00
Potato and Vegetable Guano.....	8.00	1.65	4.00
Ammoniated Dissolved Bone.....	8.00	1.65	2.00
Farmers' Profit	8.00	1.65	2.00
High Grade Potato.....	6.00	4.12	7.00
Nitrate of Soda.....	....	15.05	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

*The Mapes Formula and Peruvian Guano Co.,
143 Liberty Street, New York—*

Mapes' Complete Manure, "A" Brand.....	10.00	2.47	2.50
Mapes' Corn Manure.....	8.00	2.47	6.00
Mapes' Vegetable or Complete Manure for Light Soils	6.00	4.94	6.00
Mapes' Economical Potato Manure.....	4.00	3.29	8.00

T. W. Mewborn & Co., Kinston, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Genuine German Kainit.....	....	....	12.00

D. B. Martin Co., Richmond, Va.—

Pure Ground Bone.....Total	22.00	2.46	....
Raw Bone Meal.....Total	21.00	3.70	....
Animal Bone Potash Compound.....	16.00	1.65	2.50
Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....
Pure Dissolved Animal Bone.....	12.00	1.64	....
Potash and Soluble Bone.....	12.00	....	5.00
Potash and Soluble Bone.....	12.00	....	3.00
Acid Phosphate	12.00	....	....
Potash and Soluble Bone.....	10.00	....	6.00
Potash and Soluble Bone.....	10.00	....	5.00
Potash and Soluble Bone.....	10.00	....	4.00
Potash and Soluble Bone.....	10.00	....	3.00
Potash and Soluble Bone.....	10.00	....	2.00
Martin's Tobacco Special.....	9.00	2.46	3.00
Martin's Tobacco Compound.....	9.00	2.26	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Dissolved Organic Compound.....	9.00	1.00	3.00
Martin's High Grade Guano.....	8.75	1.65	2.00
Blood, Bone and Potash.....	8.00	4.10	7.00
Red Star Brand Fertilizer.....	8.00	4.10	5.00
Cotton and Tobacco Guano.....	8.00	3.28	6.00
Martin's Cotton Guano.....	8.00	3.28	4.00
Martin's Red Star Brand.....	8.00	3.28	4.00
Martin's Blue Ribbon Brand Fertilizer.....	8.00	3.28	2.00
Martin's Tobacco Special.....	8.00	2.52	3.00
Martin's Cotton and Tobacco Guano.....	8.00	2.46	5.00
Martin's Bull Head Fertilizer.....	8.00	2.46	3.00
Martin's Special Fertilizer, 8-2½-3.....	8.00	2.26	3.00
Martin's Cotton Guano.....	8.00	2.05	1.00
Martin's Cotton and Tobacco Guano.....	8.00	1.65	5.00
Martin's Cotton and Tobacco Guano.....	8.00	1.65	3.00
Martin's Animal Organic Compound.....	8.00	1.65	3.00
Martin's Slaughter House Special.....	8.00	1.65	2.00
Martin's Wheat Special.....	8.00	1.65	2.00
Martin's Carolina Special for Tobacco.....	8.00	1.65	2.00
Martin's Carolina Cotton.....	8.00	1.65	2.00
Corn and Cereal Special.....	8.00	1.65	2.00
Old Virginia Favorite.....	8.00	1.65	2.00
Martin's Special Potato Manure.....	8.00	1.00	5.00
One-Eight-Four.....	8.00	1.00	4.00
Martin's Peanut Grower.....	8.00	1.00	4.00
Potash and Soluble Bone.....	8.00	....	20.00
Potash and Soluble Bone.....	8.00	....	4.00
Martin's Top Dresser.....	7.00	8.22	2.50
Martin's Gilt Edge Potato Manure.....	7.00	2.46	10.00
Martin's Claremont Vegetable Grower.....	7.00	2.46	5.00
Martin's 7 Per Cent Guano.....	6.00	5.74	5.00
Martin's Animal Bone Potash Guano.....	6.00	4.10	7.00
Martin's Early Truck and Vegetable Grower..	6.00	3.28	8.00
Knowles' Special.....	6.00	3.28	6.00
Martin's Top Dresser.....	5.00	8.22	2.50
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Marietta Fertilizer Co., Atlanta, Ga.—

Marietta XXXX High Grade Acid Phosphate.	16.00
Marietta High Grade Acid Phosphate.....	14.00	....	....
Langford's Special.....	10.00	1.65	4.00
Cooper's High Grade Guano.....	10.00	1.65	2.00
Fish Compound.....	10.00	1.65	2.00
Royal Seal Guano.....	10.00	1.65	2.00
Tonawando Guano.....	10.00	1.65	2.00
Marietta Potash Special.....	10.00	....	4.00
Dissolved Bone Potash.....	10.00	....	2.00
Marietta Cotton Grower.....	9.00	2.47	3.00
Marietta Boll Producer.....	9.00	1.65	3.00
Marietta Fertilizer, No. 844.....	8.00	3.30	4.00
Marietta Fertilizer, No. 836.....	8.00	2.47	6.00
Marietta Tobacco Special.....	8.00	2.47	3.00
Marietta Fertilizer, No. 833.....	8.00	2.47	3.00
Marietta Best for Tobacco.....	8.00	2.06	3.00
Marietta Sweet Potato Special.....	8.00	2.06	3.00
Marietta Special Potato.....	8.00	1.65	10.00
Marietta Fruit and Root Special.....	8.00	1.65	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Marietta Fertilizer, No. 823.....	8.00	1.65	3.00
Marietta Guano	8.00	1.65	2.00
Marietta Manure Substitute.....	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

Marsh-Lee & Co., Marshville, N. C.—

Marsh's Acid	16.00
Marsh's Acid	14.00	....	....
Marsh's Special High Grade.....	8.00	2.47	3.00
Marsh's Cotton Fertilizer.....	8.00	1.65	2.00
Marsh's Guano for Corn.....	8.00	1.65	2.00

The MacMurphy Co., Charleston, S. C.—

High Grade Acid Phosphate, 14 Per Cent....	14.00	....	....
Acid Phosphate	13.00	....	....
Acid Phosphate and Potash.....	10.00	....	5.00
Acid Phosphate and Potash.....	10.00	....	4.00
Acid Phosphate and Potash.....	10.00	....	2.00
Wilcox & Gibbs Co.'s Manipulated Guano....	9.00	2.26	2.00
Special Cotton and Corn 8.75-2-3.....	8.75	1.65	2.00
Special 8-4-6 Guano.....	8.00	3.29	6.00
Special 8-4-4 Cotton Guano.....	8.00	3.29	4.00
Special 8-4-4 Tobacco Guano.....	8.00	3.29	4.00
Special 8-3-3 Cotton and Corn.....	8.00	2.47	3.00
Special 8-3-3 Tobacco Guano.....	8.00	2.47	3.00
Standard 8-2½-1 Guano.....	8.00	2.06	1.00
Special 8-2-2 Guano.....	8.00	1.65	2.00
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Pure German Kainit.....	....	....	12.00

Marlboro Fertilizer Co., Bennettsville, S. C.—

Marlboro Perfection Acid Phosphate.....	16.00	....	....
Nitrate of Soda.....	14.80	....	....
Marlboro High Grade Acid Phosphate.....	14.00	....	....
Marlboro Standard Acid Phosphate.....	13.00	....	....
Marlboro Perfection 8-4-4.....	8.00	4.00	4.00
Marlboro Special 8-4-4.....	8.00	4.00	4.00
Marlboro High Grade 8-3-3.....	8.00	3.00	3.00
Marlboro Excelsior 8-3-3.....	8.00	3.00	3.00
Marlboro Complete Fertilizer.....	7.00	3.00	12.00
Marlboro Fertilizer Co.'s Special Top Dresser.	4.00	10.00	3.00
Marlboro County Top Dresser.....	....	9.00	3.00
Marlboro German Kainit.....	....	....	12.00

*Martin & White Co., Norfolk, Richmond and
Baltimore—*

Phosphate and Potash.....	12.00	....	5.00
Phosphate and Potash.....	12.00	....	3.00
Phosphate and Potash.....	10.00	....	5.00
Phosphate and Potash.....	10.00	....	4.00
Phosphate and Potash.....	10.00	....	2.00
H. G. Cotton and Tobacco Guano.....	8.00	3.28	4.00
Manure Substitute	8.00	3.28	4.00
Horse Shoe Brand.....	8.00	2.46	3.00
Organic Cotton Grower.....	8.00	2.46	3.00
Fish Guano	8.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Fruit Special	8.00	1.65	2.00
Big Crop Grower.....	8.00	1.65	2.00
Special Peanut Grower.....	8.00	1.05	4.00
Royal Crop Grower.....	8.00	1.00	4.00
Blood, Bone and Potash.....	7.00	4.10	8.00
Special 7 Per Cent Trucker.....	6.00	5.74	5.00
Special Potato Grower.....	6.00	4.10	7.00
Virginia Trucker	6.00	3.38	4.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	50.00
Kainit .....	....	....	12.00

North Carolina Cotton Oil Co., Wilmington, N. C.—

High Grade Acid Phosphate.....	16.00	....	....
Acid Phosphate	14.00	....	....
Wilmington Mortgage Lifter.....	9.00	2.27	2.00
Wilmington Prolific Crop Grower.....	9.00	2.27	2.00
Wilmington's Pride	8.00	4.12	7.00
Wilmington's Truck Grower.....	8.00	3.30	4.00
Bullock's High Grade.....	8.00	3.29	4.00
Wilmington Full Value.....	8.00	3.29	4.00
Best Tobacco Grower.....	8.00	2.47	7.50
John's Special	8.00	2.47	4.00
Bullock's Cotton Grower.....	8.00	2.47	4.00
Wilmington Farmer Boy.....	8.00	2.47	4.00
The Stone Company Special.....	8.00	2.47	3.00
Clute's Cotton Grower.....	8.00	2.47	3.00
Wilmington Leader	8.00	2.47	3.00
Wilmington High Grade.....	8.00	2.47	3.00
L. P. B. Special.....	8.00	2.47	3.00
Lewis' Special	8.00	2.47	3.00
Carter's Lifter	8.00	2.47	3.00
Wilmington Standard	8.00	2.47	2.50
Pate's Special	8.00	2.47	2.00
Currie's Crop Grower.....	8.00	2.06	4.00
Wilmington Tobacco Grower.....	8.00	2.06	3.00
Wilmington Banner	8.00	1.65	3.00
Clark's Special	8.00	1.65	3.00
Wilmington Cotton Grower.....	8.00	1.65	2.00
Wilmington Special	8.00	1.65	2.00
Wilmington Headlight	6.00	3.29	8.00
Wilmington High Grade Top Dresser.....	4.50	7.40	3.00
Nitrate of Soda.....	....	14.85	....
Wilmington Special Top Dresser.....	....	7.40	3.00
Muriate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

North Carolina Cotton Oil Co., Raleigh, N. C.—

Raleigh Standard Guano.....	8.00	2.26	2.00
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North Carolina Cotton Oil Co., Charlotte, N. C.—

Dixie Standard	8.00	2.48	3.00
Majestic	8.00	1.65	2.00

North Carolina Cotton Oil Co., Henderson, N. C.—

Two in One.....	10.00	3.28	4.00
Henderson Tobacco Fertilizer.....	9.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Franklin Tobacco Fertilizer.....	9.00	2.47	3.00
Pride of Vance Tobacco Fertilizer.....	9.00	2.47	3.00
Unedit Tobacco Fertilizer.....	9.00	2.47	3.00
Two in One.....	8.00	3.29	4.00
McKinne Mixture.....	8.00	2.26	3.25
Brewer's Special.....	8.00	2.26	2.00
Henderson Cotton Grower.....	8.00	1.65	2.00
Franklin Cotton Grower.....	8.00	1.65	2.00
Unedit Cotton Grower.....	8.00	1.65	2.00
Vance Cotton Grower.....	8.00	1.65	2.00

*Nitrate Agencies Co., New York, Baltimore,
Savannah, Charleston and Norfolk—*

Acid Phosphate.....	16.00	....	....
Acid Phosphate.....	14.00	....	....
Nitrate of Soda, 95 Per Cent.....	....	15.65	....
Nitrate of Soda.....	....	15.50	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

*New Bern Cotton Oil and Fertilizer Mills,
New Bern, N. C.—*

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Special Corn and Peanut Grower.....	11.00	....	2.00
High Grade Bone and Potash.....	10.00	....	4.00
Carteret Bone and Potash.....	10.00	....	2.00
Oriole Tobacco Grower.....	8.00	3.30	4.00
Harvey's Special Meal and Fish Guano.....	8.00	2.47	3.00
Foy's High Grade Fertilizer.....	8.00	2.47	3.00
Lenoir Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Pitt's Prolife Golden Tobacco Guano.....	8.00	2.47	3.00
Favorite Cotton Grower.....	8.00	2.27	2.00
Onslow's Farmers' Reliance Guano.....	8.00	2.06	3.00
Jones County Premium Crop Grower.....	8.00	2.06	3.00
Craven Cotton Guano.....	8.00	1.65	2.00
Greene County Standard Fertilizer.....	8.00	1.65	2.00
Dunn's Standard Truck Grower.....	7.00	5.77	7.00
Ives' Irish Potato Guano.....	7.00	4.12	7.00
Eureka Tobacco Fertilizer.....	6.00	3.30	7.00
Pamlico Electric Top Dresser.....	5.00	8.25	2.50
Wooten's Special Tobacco Guano.....	4.00	3.30	6.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	15.67	....
Eureka Top Dresser.....	....	8.25	3.00
High Grade Fish Scrap.....	....	8.25	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Norfolk Fertilizer Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Oriana 16 Per Cent Acid Phosphate.....	16.00	....	....
Whitney High Grade Acid Phosphate.....	16.00	....	....
Oriana 14 Per Cent Acid Phosphate.....	14.00	....	....
Oriana Wheat Grower.....	10.00	....	4.00
Shenandoah Wheat Mixture.....	10.00	....	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Young's Grain Grower.....	10.00	....	2.00
Oriana Bone and Potash.....	10.00	....	2.00
Oriana C. S. M. Special.....	9.00	2.26	2.00
Oriana Complete Fertilizer.....	8.00	3.29	4.00
Oriana First Step Tobacco Guano.....	8.00	3.29	4.00
Oriana Tobacco Guano.....	8.00	2.47	3.00
Oriana for Cotton.....	8.00	2.47	3.00
Oriana Cotton Guano.....	8.00	1.65	2.00
Oriana Crop Grower.....	8.00	1.65	2.00
Mayodan Valley Wheat Grower.....	8.00	....	4.00
Oriana Special Mixture.....	6.00	4.11	5.00
Oriana Truck Guano.....	5.00	5.76	5.00
Pine Top Special Crop Grower.....	5.00	1.65	6.00
H. G. Tobacco Guano.....	4.00	3.29	6.00
Nitrate of Soda Mixture for Top Dressing Cotton	2.00	8.23	....
Nitrate of Soda.....	....	15.00	....
Ground Fish .....	....	8.23	....
Animal Tankage .....	....	5.76	....
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Navassa Guano Co., Wilmington, N. C.—

Navassa Acid Phosphate.....	17.00
Navassa Acid Phosphate.....	16.00	....	....
Navassa 14 Per Cent Acid Phosphate.....	14.00	....	....
Navassa Dissolved Bone.....	13.00	....	....
Navassa Special Wheat Mixture.....	12.00	....	4.00
Navassa Gray Land Mixture.....	12.00	....	4.00
Navassa Acid Phosphate.....	12.00	....	....
Maxim Guano	10.00	2.47	2.00
Corona Guano	10.00	1.65	2.00
Navassa Wheat and Grass Grower.....	10.00	....	4.00
Navassa Wheat Mixture.....	10.00	....	2.25
Navassa Dissolved Bone with Potash.....	10.00	....	2.00
Navassa Fish Guano.....	9.00	2.47	3.00
Navassa Manipulated Guano.....	9.00	2.26	2.00
Osceola Guano	9.00	1.65	3.00
Harvest Queen Fertilizer.....	9.00	1.65	2.00
Navassa Complete Fertilizer.....	9.00	1.65	1.00
Farmers' Special Mixture.....	8.75	2.25	4.00
Navassa Universal Fertilizer.....	8.50	2.06	1.00
Coree Tobacco Guano.....	8.00	3.29	4.00
Navassa High Grade Fertilizer.....	8.00	3.29	4.00
Navassa Special Truck Guano.....	8.00	3.20	4.00
Navassa Carib Guano.....	8.00	2.47	10.00
Navassa Blood and Meal Mixture.....	8.00	2.47	5.00
Orton Guano	8.00	2.47	4.00
Navassa High Grade Guano.....	8.00	2.47	3.00
Clarendon Tobacco Guano.....	8.00	2.47	3.00
Navassa Cotton-seed Meal Special 3 Per Cent Guano	8.00	2.47	2.00
Navassa Strawberry Top Dressing.....	8.00	2.06	4.00
Mogul Guano	8.00	2.06	3.00
Navassa Guano for Tobacco.....	8.00	2.06	2.00
Ammoniated Soluble Navassa Guano.....	8.00	2.06	2.00
Brooks' Ammoniated Guano.....	8.00	2.06	1.50
Navassa Fruit Grower Fertilizer.....	8.00	1.65	6.00
Harvest King Guano.....	8.00	1.65	3.00
Clark's Special Cotton-seed Meal Guano.....	8.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Navassa Grain Fertilizer.....	8.00	1.65	2.00
Navassa Cotton-seed Meal Guano.....	8.00	1.65	2.00
Navassa Cotton Fertilizer.....	8.00	1.65	2.00
Ocoonechee Tobacco Guano.....	8.00	1.65	2.00
Navassa Dissolved Bone with Potash.....	8.00	....	4.00
Navassa Lettuce Grower Fertilizer.....	7.00	7.00	7.00
Navassa Root Crop Fertilizer.....	7.00	4.12	7.00
Navassa Creole Guano.....	6.00	4.12	7.00
Navassa H. G. Top Dresser.....	4.00	7.82	4.00
Navassa Top Dresser.....	4.00	6.17	2.50
Sulphate of Ammonia.....	....	20.59	....
Nitrate of Soda.....	....	14.82	....
Blood .....	....	13.15	....
Fish Scrap .....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

G. Ober & Sons Co., Baltimore, Md.—

Pure Raw Bone Meal.....Total	21.00	3.71	....
Ober's High Grade Acid Phosphate.....	16.00	....	....
Ober's Dissolved Bone Phosphate.....	14.00	....	....
Ober's Standard Potash Compound.....	12.00	....	5.00
Ober's Dissolved Animal Bone.....	10.00	2.47	....
Ober's Dissolved Bone, Phosphate and Potash.....	10.00	....	2.00
Ober's Special High Grade Fertilizer.....	9.00	2.47	3.00
Ober's Special Ammoniated Dissolved Bone...	9.00	1.65	2.00
Ober's Farmers' Mixture.....	9.00	.82	2.00
Ober's H. G. Fertilizer.....	8.00	3.30	4.00
Ober's Special Compound for All Crops.....	8.00	2.47	3.00
Ober's Special Compound for Tobacco.....	8.00	2.47	3.00
Cooper's Pungo Guano.....	8.00	2.06	2.00
Ober's Standard Tobacco Fertilizer.....	8.00	1.65	2.00
Ober's Special Cotton Compound.....	8.00	1.65	2.00
Ober's Soluble Ammoniated Superphosphate of Lime	8.00	1.65	2.00
Ober's Stag Guano.....	8.00	.82	4.00
Ober's Acid Phosphate with Potash.....	8.00	....	4.00
Ground Fish	6.87	9.49	....
Ober's Complete Fertilizer.....	6.00	4.12	6.00
Ober's Special Potash Compound for Tobacco.....	6.00	2.47	7.00
Ober's Special Tobacco Bed Fertilizer, 10 Per Cent	4.00	8.25	3.00
Nitrate of Soda.....	....	15.50	....
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Old Buck Guano Co., Richmond, Va.—

Old Buck Quincy Tobacco and Garden.....	8.00	2.47	3.00
Saxon	8.00	1.65	2.00

The Pocomoke Guano Co., Norfolk, Va.—

Pure Ground Bone.....Total	20.00	3.70	....
Superb Acid Phosphate	16.00	....	....
Peerless Acid Phosphate.....	14.00	....	....
Pocomoke 12-5 Bone and Potash.....	12.00	....	5.00
Alkaline Bone	11.00	....	2.00
Pocomoke Bone and Potash Mixture.....	10.00	....	4.00
10-2 Potash Mixture.....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Monticello Animal Bone Fertilizer.....	9.00	1.85	1.00
Cinco Tobacco Guano.....	8.50	2.06	2.50
Pocomoke Superphosphate.....	8.50	1.65	2.00
Electric Crop Grower.....	8.50	1.65	2.00
Garrett's Grape Grower.....	8.00	3.29	10.00
Faultless Ammoniated Superphosphate.....	8.00	3.29	4.00
Pocomoke Sweet Potato Grower.....	8.00	2.47	3.00
Harvey's High Grade Monarch.....	8.00	2.47	3.00
Monarch Tobacco Grower.....	8.00	2.47	3.00
C. C. C. (Crescent Complete Compound).....	8.00	1.65	3.00
Pamlico Superphosphate.....	8.00	1.65	2.00
Pocomoke Wheat, Corn and Peanut Manure..	8.00	1.00	4.00
Pocomoke Defiance Bone and Potash.....	8.00	....	4.00
Standard Truck Guano.....	7.00	4.11	5.00
Freeman's 7 Per Cent Irish Potato Grower...	6.00	5.76	5.00
Seaboard Popular Trucker.....	6.00	5.76	5.00
Coast Line Truck Guano.....	5.00	8.23	3.00
Pocomoke Top Dresser.....	4.00	8.23	2.00
Smith's Special Formula.....	4.00	3.29	6.00
Nitrate of Soda.....	....	15.00	....
Ground Fish.....	....	8.23	....
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	49.00
Genuine German Kainit.....	....	....	12.00

Peruvian Guano Corporation, Charleston, S. C.—

Peruvian Guano Ex. S. S. Caitlness-shire....	18.00	3.08	2.40
Acid Phosphate.....	16.00	....	....
Peruvian Guano Ex. S. S. Chipana.....	14.00	3.29	2.00
Peruvian Guano Ex. S. S. Condor.....	14.00	2.46	2.00
Peruvian Guano Ex. S. S. Belle of Scotland..	14.00	2.14	1.70
Acid Phosphate.....	14.00	....	....
Peruvian Guano Ex. S. S. Capac.....	13.00	4.93	2.00
Acid Phosphate.....	13.00	....	....
Peruvian Guano Ex. S. S. Chipana "Lobos Isl".	12.00	2.88	2.00
Peruvian Guano Ex. S. S. Chipana "Bellestas".	11.00	6.78	2.75
Peruvian Guano Ex. S. S. Chipana "Smith Isl".	11.00	5.76	2.00
Peruvian Guano Ex. S. S. Belle of Scotland...	10.00	4.11	2.00
"Chincha Island" High Grade Peruvian Mix- ture.....	10.00	3.29	4.00
"Penguin" Peruvian Compound.....	10.00	2.46	3.00
"Albatross" Peruvian Formula.....	10.00	1.64	4.00
Peruvian Top Dresser.....	8.00	6.99	3.50
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	14.80	....
Dried Blood.....	....	13.10	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

Pamlico Chemical Co., Washington, N. C.—

Pamlico 16 Per Cent Acid Phosphate.....	16.00
Pamlico Bone Phosphate.....	14.00	....	....
Martin County Peanut Grower.....	10.00	1.23	4.00
Pamlico Peanut Guano.....	10.00	....	4.00
Dissolved Bone and Potash.....	10.00	....	2.00
Pitt County High Grade Tobacco Guano....	9.00	2.88	10.00
Blount's Special Cotton Grower.....	9.00	2.27	2.00
Prosperity Cotton Grower.....	9.00	2.26	2.00
Bissett's Special Cotton Grower.....	9.00	2.06	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
United States High Grade Tobacco Guano....	8.00	4.12	10.00
Cowell's Great Potato Grower.....	8.00	4.12	7.00
Pamlico 8-4-4 Guano.....	8.00	3.30	4.00
Bull's Eye Tobacco Grower.....	8.00	3.30	4.00
Early Sweet Potato.....	8.00	2.47	10.00
Pamlico High Grade Tobacco Grower.....	8.00	2.47	5.00
Success Guano	8.00	2.47	3.00
Blount's Special Tobacco Grower.....	8.00	2.47	3.00
Tobacco Growers' Friend.....	8.00	2.47	3.00
Fountain's Special Guano.....	8.00	2.26	4.50
Farmers' Best Guano.....	8.00	2.06	3.00
Pamlico Bone and Fish Guano.....	8.00	1.65	2.00
Pamlico Cotton Guano.....	8.00	1.65	2.00
Pamlico 7-7-7 Guano.....	7.00	5.77	7.00
Pamlico Special Irish Potato Guano.....	7.00	4.12	7.00
Pamlico Special Sweet Potato Guano.....	7.00	4.12	5.00
Pamlico Favorite Guano.....	7.00	4.12	5.00
Blount's H. G. Potato Grower.....	7.00	4.12	5.00
Faulkland H. G. Tobacco Guano.....	6.00	2.47	6.00
Acidulated Fish Scrap.....	5.50	7.82	....
Cowell's Great Cabbage Grower.....	5.00	8.25	2.50
4-3-5 Guano	4.00	2.47	5.00
Pamlico Cereal Side Dresser.....	3.00	7.42	3.00
Sulphate of Ammonia.....	....	20.62	....
Nitrate of Soda.....	....	14.85	....
Pamlico Quick Step Side Dresser.....	....	8.25	3.00
Pamlico Ground Fish.....	....	8.25	....
Sulphate of Potash.....	....	....	55.00
Muriate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

*Planters Fertilizer and Phosphate Co., Charleston,
S. C.—*

16 Per Cent Acid Phosphate.....	16.00	....	....
Planters' High Grade Acid Phosphate.....	14.00	....	....
Excelsior H. G. Acid Phosphate.....	14.00	....	....
Planters' Soluble Bone.....	13.00	....	....
Planters' Bone and Potash.....	12.00	....	1.00
Acid and Potash.....	10.00	5.76	5.00
Planters' Special Meal Mixture.....	10.00	1.65	2.00
Planters' Grain Grower.....	10.00	.82	3.00
Special Mixture	10.00	....	5.00
Planters' Acid and Potash.....	10.00	....	4.00
Planters' Bone and Potash.....	10.00	....	2.00
Planters' Blood and Fish Guano.....	9.00	1.65	3.00
Planters' Special Mixture.....	9.00	.82	3.00
Planters' Special Mixture.....	8.00	4.12	5.00
Planters' Special Cotton Fertilizer.....	8.00	3.29	4.00
Planters' Bright Tobacco Fertilizer.....	8.00	3.29	4.00
Special Mixture	8.00	2.50	3.00
Planters' Cotton and Corn Fertilizer.....	8.00	2.47	4.00
Planters' H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Planters' Soluble Guano.....	8.00	2.47	3.00
Planters' Fertilizer	8.00	2.06	2.00
Planters' Standard Fertilizer.....	8.00	1.65	2.00
Planters' Bone and Potash.....	8.00	....	4.00
Special Mixture	7.00	5.76	7.00
Special Mixture	7.00	4.11	7.00
Special Mixture	7.00	4.11	5.00
Planters' H. G. Top Dresser.....	4.00	6.18	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda.....	14.83	....
Planters' Muriate of Potash.....	48.00
Sulphate of Potash.....	48.00
Planters' German Kainit.....	12.00

Planters Guano Co., Dunn, N. C.—

Planters' High Grade Acid.....	16.00	....	....
Planters' Acid	14.00	....	....
Uncle Zeb	9.50	2.27	5.00
Bull of the Field.....	8.00	2.47	4.00
Planters' Special	8.00	2.47	3.00
Dunn Hustler	8.00	2.47	3.00
Sampson Cotton Grower.....	8.00	1.65	2.00
German Kainit .....	....	....	12.00

Central Phosphate Co., Mount Pleasant, Tenn.—

Tennessee Phosphate Rock.....Total	28.00
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Pearsall & Co., Wilmington, N. C.—

Pearsall's H. G. Acid Phosphate.....	16.00
Pearsall's H. G. Acid Phosphate.....	14.00
Pearsall's Bone and Potash.....	10.00	....	4.00
Days' Special	8.00	3.29	4.00
Fish and Potash Compound.....	8.00	3.29	4.00
Bone Meal and Fish.....Total	8.00	3.29	4.00
Pearsall's Berry Guano.....	8.00	2.47	10.00
Pearsall's Usene Guano.....	8.00	2.47	3.00
Pearsall's High Grade Tobacco.....	8.00	2.47	3.00
Pearsall's F. F. F. G.....	8.00	2.47	3.00
Currie's Cotton and Corn Guano.....	8.00	1.65	3.00
Pearsall's Corn Guano.....	8.00	1.65	3.00
Pearsall's Eagle	8.00	1.65	2.00
Pearsall's Potato and Truck Guano.....	6.00	4.12	7.00
Nitrate of Soda.....	....	14.85	....
Nitrate of Soda.....	....	14.80	....
Ground Fish .....	....	8.22	....
Pearsall's Top Dresser.....	....	7.42	3.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pacific Guano Co., Charleston, S. C.—

Standard Pacific Acid Phosphate.....	12.00	....	....
Standard Soluble Pacific Guano.....	8.50	1.65	2.00
High Grade Pacific Fertilizer.....	8.00	2.46	3.00

Powhatan Chemical Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone Meal.....Total	22.50	3.70	....
Magic Dissolved Bone Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
Powhatan Acid Phosphate.....	13.00	....	....
Magic Corn Special.....	12.00	1.00	2.00
High Grade Bone and Potash Mixture.....	12.00	....	5.00
Virginia Dissolved Bone.....	12.00	....	....
Magic Corn Grower.....	10.00	.82	1.00
Magic Corn Grower.....	10.00	.82	1.00
Magic Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Guilford Special Tobacco Fertilizer.....	9.00	2.47	6.00
Ralling's Special Fertilizer.....	9.00	2.47	2.00
Economic Cotton Grower.....	9.00	2.26	2.00
Johnson's Best Fertilizer.....	9.00	2.06	5.00
Holt's Magic Fertilizer.....	9.00	2.06	5.00
Union Magic Fertilizer.....	9.00	1.85	4.00
North Carolina Favorite.....	9.00	1.65	3.00
Powhatan Special Fertilizer.....	9.00	1.65	2.00
Magic Mixture.....	9.00	1.65	1.00
Magic Wheat Grower.....	9.00	.82	2.00
King Trucker.....	8.00	4.11	5.00
Tomlinson's Best Fertilizer.....	8.00	3.70	7.00
Copeland's Magic Fertilizer.....	8.00	3.29	8.00
North State Special.....	8.00	3.29	4.00
Tomlinson's Favorite Fertilizer.....	8.00	2.88	5.00
Tomlinson's Special Fertilizer.....	8.00	2.47	5.00
Magic Fertilizer.....	8.00	2.47	4.00
Johnson's Special Fertilizer.....	8.00	2.47	3.00
P. C. Co.'s Hustler.....	8.00	2.47	3.00
King Brand Fertilizer.....	8.00	2.06	3.00
White Leaf Tobacco Fertilizer.....	8.00	2.06	3.00
Powhatan Peanut Fertilizer.....	8.00	1.65	4.00
Magic Cotton Grower.....	8.00	1.65	2.00
Magic Special Fertilizer.....	8.00	1.65	2.00
Magic Tobacco Grower.....	8.00	1.65	2.00
Magic Peanut Special.....	8.00	.82	4.00
Magic Peanut Grower.....	8.00	....	4.00
Magic Grain and Grass Grower.....	8.00	....	4.00
Powhatan Bone and Potash Mixture.....	8.00	....	4.00
Powhatan Trucker.....	7.00	4.94	5.00
Copeland's Special Fertilizer.....	6.00	3.29	7.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Pine Level Oil Mill Co., Pine Level, N. C.—

Pine Level 16 Per Cent Acid Phosphate.....	16.00
Pine Level 14 Per Cent Acid Phosphate.....	14.00	....	....
Bone and Potash Mixture.....	10.00	....	4.00
Sutton's Potato Guano.....	9.00	2.88	5.00
Xantho Tobacco Guano.....	8.00	3.30	4.00
Oliver's Truck Grower Guano.....	8.00	3.30	4.00
Hale's Special for Tobacco.....	8.00	2.47	4.00
Pine Level High Grade.....	8.00	2.47	3.00
Cotton Grower for All Crops.....	8.00	1.65	2.00
H. G. Top Dresser.....	3.00	6.03	6.00
Nitrate of Soda.....	....	15.22	....
Muriate of Potash.....	....	....	48.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Patapsco Guano Co., Baltimore, Md.—

Patapsco Pure Ground Bone.....Total	20.59	3.70	....
Florida Soluble Phosphate.....	16.00	....	....
Patapsco Pure Dissolved S. C. Phosphate....	14.00	....	....
Patapsco High Grade Phosphate and Potash.	11.00	....	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Baltimore Soluble Phosphate.....	11.00	....	2.00
Patapsco 10 and 4 Potash Mixture.....	10.00	....	4.00
Patapsco Soluble Phosphate and Potash.....	10.00	....	2.00
Patapsco Guano for Tobacco.....	9.25	2.06	2.00
Taukage .....Total	9.15	7.41	....
Patapsco Tobacco Fertilizer.....	9.00	2.47	5.00
Patapsco Cotton and Corn Special.....	9.00	2.06	5.00
Patapsco Guano	9.25	2.06	2.00
Coon Brand Guano.....	9.00	.82	5.00
Patapsco Cotton and Tobacco Special.....	8.00	3.29	4.00
Patapsco Plant Food for Tobacco, Potatoes and Truck	8.00	2.47	5.00
Choctaw Guano	8.00	2.47	3.00
Patapsco Special Tobacco Mixture.....	8.00	2.06	3.00
Unicorn Guano	8.00	2.06	5.00
Swanson's Gold Leaf Special.....	8.00	2.06	2.00
Planters' Favorite	8.00	1.65	2.00
Sea Gull Ammoniated Guano.....	8.00	1.65	2.00
Grange Mixture	8.00	1.65	2.00
Patapsco 7-7-7 Truck Guano.....	7.00	5.76	7.00
Patapsco Trucker for Early Vegetables.....	7.00	4.11	5.00
Money Maker Guano.....	7.00	3.70	6.00
Ground Fish .....Total	6.00	8.23	....
Patapsco Potato Guano.....	6.00	4.11	7.00
Patapsco Crop Dresser.....	4.00	3.29	4.00
Sulphate of Ammonia.....	....	20.16	....
Nitrate of Soda.....	....	15.00	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Pocahontas Guano Co., Lynchburg, Va.—

Fine Ground Bone Meal.....Total	23.00	2.47	....
Pure Raw Bone Meal.....Total	22.00	3.71	....
Pure Raw Bone Meal.....Total	22.00	3.71	....
Carrington's S. C. Phosphate, Waukesha Brand	16.00	....	....
Imperial Dissolved S. C. Phosphate.....	14.00	....	....
Indian Special Grain and Grass Guano.....	12.00	....	5.00
Wabash Wheat Mixture.....	10.00	....	4.00
Carrington's Superior Grain Compound.....	10.00	....	2.00
Pocahontas Special Tobacco Fertilizer.....	9.00	2.47	3.00
High Grade 4 Per Cent Tobacco Compound, Mohawk King	9.00	1.85	4.00
Yellow Tobacco Special.....	9.00	1.65	2.00
Standard Tobacco Guano, Old Chief Brand..	9.00	1.65	2.00
Planters' Special	9.00	.82	2.00
Indian Tobacco Grower.....	8.00	2.47	4.00
Farmers' Favorite Apex Brand.....	8.00	2.47	3.00
Special Truck Grower, Eagle Mount Brand..	8.00	2.06	6.00
Spot Cash Tobacco Compound.....	8.00	2.06	3.00
Carrington's Banner Brand Guano.....	8.00	1.65	2.00
A. A. Complete Champion Brand.....	8.00	1.00	3.00
Cherokee Grain Special.....	8.00	....	4.00

Planters Cotton Seed Oil Co., Rocky Mount, N. C.—

16 Per Cent Acid Phosphate.....	16.00	....	....
14 Per Cent Acid Phosphate.....	14.00	....	....
Royal Cotton Grower.....	9.00	2.26	2.00
Gorham H. G. Guano.....	8.00	3.29	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Tar River Special.....	8.00	2.47	3.00
Planters' C. S. Oil Co.'s Tobacco Guano.....	8.00	2.47	3.00
Planters' C. S. Oil Co.'s Cotton Guano.....	8.00	1.65	2.00
Eagle Guano	8.00	1.65	2.00
Planters' Special Potato Guano.....	7.00	4.12	5.00
E. L. D. Special.....	7.00	2.47	3.00
Braswell's Special for Tobacco.....	7.00	2.26	3.50
Planters' Top Dresser.....	3.50	7.82	3.00
Nitrate of Soda.....	....	15.65	....
Ground Fish Scrap.....	....	8.23	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Piedmont-Mt. Airy Guano Co., Baltimore, Md.—

Piedmont Bone Meal.....Total	21.00	3.29
Piedmont 16 Per Cent Acid Phosphate.....	16.00	....	....
Piedmont 14 Per Cent Acid Phosphate.....	14.00	....	....
Piedmont Special Potash Mixture.....	10.00	....	5.00
Levering's Potashed Bone.....	10.00	....	4.00
Piedmont Farmers' Bone and Potash.....	10.00	....	2.00
Piedmont 6-9-2 Fertilizer.....	9.00	4.94	2.00
Piedmont 2-9-8 Fertilizer.....	9.00	1.65	8.00
Piedmont Farmers' Standard.....	9.00	1.65	2.00
Piedmont Essential Tobacco Compound.....	9.00	1.65	2.00
Piedmont Farmers' Cotton Grower.....	9.00	.82	3.00
Levering's Ammoniated Bone.....	9.00	.82	3.00
Piedmont Special Farmers' Tobacco Guano..	8.40	2.47	4.00
Piedmont General Truck Grower.....	8.00	4.12	5.00
Piedmont 4-8-10 Guano.....	8.00	3.29	10.00
Piedmont Unexcelled Guano.....	8.00	3.29	4.00
Piedmont High Grade Ammoniated Bone and Potash	8.00	2.47	3.00
Piedmont High Grade Guano for Cotton.....	8.00	2.47	3.00
Levering's Reliable Tobacco Guano.....	8.00	2.47	3.00
Piedmont Guano for Tobacco.....	8.00	2.06	3.00
Piedmont Guano for All Crops.....	8.00	2.06	3.00
Levering's Standard	8.00	1.65	3.00
Piedmont Bone and Peruvian Mixture.....	8.00	1.65	2.00
Piedmont Special for Cotton, Corn and Pea- nuts	8.00	1.65	2.00
Piedmont Red Leaf Tobacco Guano.....	8.00	1.65	2.00
Piedmont Cultivator Brand.....	8.00	1.65	2.00
Piedmont Farmers' Favorite.....	8.00	.82	4.00
Piedmont Star Bone and Potash.....	8.00	....	5.00
Piedmont 7-7-7 Truck Guano.....	7.00	5.76	7.00
Piedmont 5-7-8 Guano.....	7.00	4.12	8.00
Piedmont 5-7-5 Guano.....	7.00	4.12	5.00
Piedmont Special Truck Fertilizer.....	6.00	5.76	7.00
Piedmont Special Potato Guano.....	6.00	4.94	7.00
Piedmont Early Vegetable Manure.....	6.00	4.12	7.00
Piedmont Early Truck.....	6.00	4.12	5.00
Piedmont Vegetable Compound.....	6.00	3.29	8.00
Piedmont Potato Producer.....	5.00	2.47	6.00
Sulphate of Ammonia.....	....	20.58	....
Nitrate of Soda.....	....	15.22	....
Boykin's Top Dresser.....	....	7.41	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Quinnepiac Co., Charleston, S. C.—</i>			
Standard Quinnepiac Acid Phosphate.....	13.00	....	....
Standard Quinnepiac Pine Island Ammoniated Superphosphate	9.00	1.85	1.00
<i>The Robertson Fertilizer Co., Norfolk, Va.—</i>			
Robertson's Raw Bone Meal.....Total	21.00	3.71	....
High Peak Acid Phosphate.....	16.00	....	....
Scepter Brand Acid Phosphate.....	14.00	....	....
Robertson's Dissolved Bone.....	13.00	2.06	....
I. M. C. Acid Phosphate.....	13.00	....	....
J. W. S. Special Bone and Potash Mixture..	12.00	....	5.00
J. W. S. Alkaline Bone.....	10.00	....	5.00
Skyscraper Bone and Potash Compound....	10.00	....	4.00
Level Run Dissolved Bone and Potash.....	10.00	....	2.00
J. W. S. Complete Guano.....	9.00	2.06	5.00
Beaver Brand Soluble Guano.....	9.00	1.85	4.00
Robertson's Blood and Bone Mixture.....	9.00	1.00	2.00
P. M. C. High Grade Soluble Guano.....	8.00	4.12	7.00
Wood's Winner H. G. Guano.....	8.00	3.30	4.00
Robertson's Soluble H. G. Guano.....	8.00	2.47	4.00
Robertson's Special Formula for Tobacco....	8.00	2.47	3.00
Big Cropper High Grade Guano.....	8.00	2.47	3.00
Robertson's X-(T) Tobacco Grower.....	8.00	2.06	2.00
Double Dollar Soluble Guano.....	8.00	1.65	2.00
Farmers' Bone	8.00	1.65	2.00
Ten Strike Soluble Crop Producer.....	8.00	1.00	4.00
M. C. Special Bone and Potash Mixture.....	8.00	....	4.00
Tidewater Truck Guano.....	7.00	4.12	5.00
Robertson's 5-6-7	6.00	4.12	7.00
Robertson's 7 Per Cent for Truck.....	5.00	5.77	5.00
Robertson's 10 Per Cent Truck Guano.....	2.00	8.25	2.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Fish .....	....	9.04	....
Fish Guano .....	....	8.23	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

F. S. Royster Guano Co., Norfolk, Va.—

Raw Bone Meal.....Total	20.25	3.71	....
Royster's H. G. 17 Per Cent Acid Phosphate.	17.00	....	....
Royster's H. G. 16 Per Cent Acid Phosphate.	16.00	....	....
Royster's 14 Per Cent Acid Phosphate.....	14.00	....	....
Royster's Dissolved Bone.....	13.00	....	....
Royster's XX Acid Phosphate.....	12.00	....	....
Royster's Bone and Potash Mixture.....	11.00	....	5.00
Royster's Soluble Guano.....	10.00	1.65	2.00
Royster's 10 and 5 Bone and Potash Mixture.	10.00	....	5.00
Royster's 10 and 4 Bone and Potash Mixture.	10.00	....	4.00
Royster's Bone and Potash for Grain.....	10.00	....	3.00
Royster's Bone and Potash Mixture.....	10.00	....	2.00
M. P. F. Mixture.....	9.50	3.30	5.00
Royster's 4-9-5 Special.....	9.00	3.30	5.00
Tomlinson's Special.....	9.00	2.47	5.00
Royster's Meal Mixture.....	9.00	2.26	2.00
Royster's Cotton Grower.....	9.00	2.26	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Actd.	Nitrogen.	Potash.
Watkins' Special	9.00	2.06	5.00
Haynes' Special	9.00	2.06	3.00
Viking Ammoniated Guano.....	9.00	1.65	3.00
Special Compound	9.00	1.65	1.00
Royster's Special 1-9-2 Guano.....	9.00	.82	2.00
H. B. & Co.'s Special.....	8.00	4.69	10.00
Royster's Best Guano.....	8.00	3.71	7.00
Cobb's High Grade for Tobacco.....	8.00	3.30	5.00
Trucker's Delight.....	8.00	3.30	4.00
Milo Tobacco Guano.....	8.00	3.00	4.00
Jupiter High Grade Guano.....	8.00	3.30	4.00
Royster's Special 4-8-3.....	8.00	3.30	3.00
Gorham's Special	8.00	3.30	2.50
Black Wrapper Special Tobacco Guano.....	8.00	3.30	2.00
Eagle's Special Tobacco Guano.....	8.00	2.47	5.00
Bonanza Tobacco Guano.....	8.00	2.47	3.00
Marlboro High Grade Cotton Guano.....	8.00	2.47	3.00
Royster's Special Sweet Potato Guano.....	8.00	2.47	3.00
Williams' Special Guano.....	8.00	2.06	5.00
Orinoco Tobacco Guano.....	8.00	2.06	3.00
Special Tobacco Compound.....	8.00	2.06	2.00
Corbett & Moore's Special.....	8.00	1.65	3.50
Royster's Special Wheat Fertilizer.....	8.00	1.65	2.00
Royster's Complete Guano.....	8.00	1.65	2.00
Farmers' Bone Fertilizer.....	8.00	1.65	2.00
Webb's Korn King.....	8.00	1.65	2.00
Farmers' Bone Fertilizer for Tobacco.....	8.00	1.65	2.00
Jumbo Peanut Grower.....	8.00	1.02	4.00
Royster's 8 and 4 Bone and Potash Mixture.	8.00	....	4.00
Battle's Favorite	7.25	3.91	5.25
Royster's Special 7 Per Cent Truck Guano..	7.00	5.77	7.00
Royster's Early Truck Guano.....	7.00	4.12	8.00
Royal Special Potato Guano.....	7.00	4.12	7.00
Royal Potato Guano.....	7.00	4.12	5.00
Pasquotank Potato Guano.....	7.00	3.30	8.00
Royster's Special 13 Per Cent Plant Food...	7.00	2.47	3.00
Royster's Peanut Special.....	7.00	....	5.00
Ballentine's Potato Guano.....	6.00	5.77	7.00
Arrow Potato Guano.....	6.00	5.77	5.00
Royster's Irish Potato Guano.....	6.00	4.12	7.00
Royster's Special	6.00	4.12	5.00
Oakley's Special Tobacco Guano.....	6.00	3.30	4.00
McDowell's Cotton Grower.....	6.00	3.30	2.00
Humphrey's Special for Tobacco.....	6.00	2.55	3.20
Royster's 2-6-5 Special.....	6.00	1.65	5.00
Royster's Special 21 Per Cent Plant Food....	5.50	4.52	10.00
Royster's Special 20 Per Cent Plant Food....	5.00	4.10	10.00
Wiggins' Special	5.50	3.30	3.00
Royster's Cabbage Guano.....	5.00	8.23	2.50
Royster's Special 10 Per Cent Truck Guano..	5.00	8.24	3.00
Harvey's Cabbage Guano.....	5.00	6.59	3.00
Royster's Potato Guano.....	5.00	4.94	7.00
Phillips' Special	5.00	1.65	6.00
Presto Top Dresser.....	4.00	8.22	4.00
Royster's Special Top Dresser.....	4.00	6.18	2.50
Royster's 4-6-4 Special.....	4.00	4.94	4.00
Dried Fish Scrap.....	3.00	9.05	....
Ground Fish Scrap.....	3.00	8.25	....
Nitrate of Soda.....	....	15.22	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Magic Top Dresser.....	7.42	3.00
Sulphate of Potash.....	50.00
Muriate of Potash.....	48.00
Manure Salts.....	20.00
Genuine German Kainit.....	12.00

Robersonville Guano Co., Robersonville, N. C.—

Roberson's H. G. Acid Phosphate.....	16.00
Roberson's H. G. Tobacco Grower.....	8.00	2.47	3.00
Roberson's H. G. Fish and Meal Guano.....	8.00	2.47	3.00
Roberson's H. G. Cotton Grower.....	8.00	2.47	3.00
Roberson's Special 7-7-7 Potato Grower.....	7.00	5.77	7.00
Roberson's H. G. Truck Guano.....	7.00	4.12	5.00
Roberson's 7 Per Cent Potato Guano.....	6.00	5.77	5.00
Robersonville H. G. Top Dresser.....	4.00	8.23	3.00
Sulphate of Ammonia.....	....	20.50	....
Nitrate of Soda.....	....	15.60	....
Dried Blood.....	....	13.62	....
Fish Scrap, Ground.....	....	8.00	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Roberson's Genuine German Kainit.....	....	....	12.00

Richmond Guano Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone Meal.....Total	22.50	3.70	....
Rex Dissolved Bone Phosphate.....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
High Grade Wheat and Grass Fertilizer.....	14.00	....	....
Premium Bone and Potash Mixture.....	13.00	....	3.00
Premium Dissolved Bone.....	13.00	....	....
Hunter & Dunn's Dissolved Bone.....	13.00	....	....
Premium Corn Special.....	12.00	1.00	2.00
H. G. Bone and Potash Mixture.....	12.00	....	5.00
Old Homestead Dissolved Bone.....	12.00	....	....
Dissolved S. C. Phosphate.....	12.00	....	....
Premium Corn Grower.....	10.00	.82	1.00
Bone Mixture.....	10.00	.82	1.00
Johnson's Best Bone and Potash.....	10.00	....	5.00
Rex Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Sanders' Special Formula for Bright Tobacco.	9.00	2.88	5.00
Hunter & Dunn's Special Ammoniated Fer- tilizer.....	9.00	2.47	2.25
Collins' Special Fertilizer.....	9.00	2.47	2.00
Carolina Cotton Grower.....	9.00	2.26	2.00
Burton's Special Tobacco Fertilizer.....	9.00	2.06	3.00
C. & B.'s Best Fertilizer.....	9.00	2.00	3.00
Lowery's Special Fertilizer.....	9.00	1.65	3.00
Cracker Jack Fertilizer.....	9.00	1.65	2.00
Bone Mixture.....	9.00	1.65	1.00
Premium Cotton Grower.....	9.00	.82	3.00
Premium Wheat Grower.....	9.00	.82	2.00
Southern Trucker.....	8.00	4.11	5.00
Perfection Special.....	8.00	3.29	4.00
Carolina Bright Tobacco Fertilizer.....	8.00	2.47	3.00
Gilt Edge Fertilizer.....	8.00	2.47	3.00
Gilt Edge Tobacco Fertilizer.....	8.00	2.47	3.00
Carolina Bright Special Tobacco Fertilizer...	8.00	2.26	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Tip Top Fertilizer.....	8.00	2.06	3.00
Tip Top Tobacco Fertilizer.....	8.00	2.06	3.00
Carolina Bright for Cotton.....	8.00	2.06	1.50
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25
Benson's Favorite Fertilizer.....	8.00	1.65	10.00
Benson's Special Fertilizer.....	8.00	1.65	6.00
Rex Tobacco Fertilizer.....	8.00	1.65	4.00
Premium Tobacco Fertilizer.....	8.00	1.65	2.00
Premium Brand Fertilizer.....	8.00	1.65	2.00
Hunter & Dunn's Ammoniated Fertilizer....	8.00	1.65	2.00
Parker & Hunt's Special Tobacco Fertilizer..	8.00	1.65	2.00
Parker & Hunt's Special Fertilizer.....	8.00	1.65	2.00
Edgecombe Cotton Grower.....	8.00	1.65	2.00
Premium Grain Special.....	8.00	.82	4.00
Premium Peanut Special.....	8.00	.82	4.00
Parker & Hunt's Corn Fertilizer.....	8.00	.82	3.00
Premium Peanut Grower.....	8.00	....	4.00
Tip Top Bone and Potash Mixture.....	8.00	....	4.00
Winter Grain and Grass Grower.....	8.00	....	4.00
Clark's Special Formula.....	7.00	4.94	6.00
Special High Grade for Truck.....	7.00	4.94	5.00
10 Per Cent Cabbage Guano.....	6.00	8.23	2.00
Smith's 7 Per Cent Special.....	6.00	5.76	5.00
Edwards' Prolific Cotton Grower.....	6.00	3.29	4.00
Carter's Special for Tobacco.....	4.00	2.47	6.00
Smith's Special Fertilizer.....	4.00	1.65	7.00
Sulphate of Ammonia.....	....	19.75	....
Nitrate of Soda.....	....	15.63	....
Special Top Dresser.....	....	7.30	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Red Cross Guano Co., Lynchburg, Va.—

Pure Raw Bone Meal.....Total	22.00	3.71	....
Red Cross Bone Meal.....Total	22.00	3.00	....
Red Cross H. G. Phosphate.....	16.00	....	....
Red Cross Standard Phosphate.....	14.00	....	....
Red Cross Grain Grower.....	10.00	....	4.00
Red Cross Bone and Potash.....	10.00	....	2.00
Red Cross for Tobacco and Truck.....	9.00	1.85	4.00
Red Cross for Bright Tobacco.....	9.00	1.65	2.00
Red Cross Special for Tobacco.....	8.00	2.47	3.00
Red Cross Tobacco Guano.....	8.00	2.06	3.00
Red Cross Crop Grower.....	8.00	1.65	2.00

Rasin-Monumental Co., Baltimore, Md.—

Rasin 16 Per Cent Acid Phosphate.....	16.00	....	....
Rasin 14 Per Cent Acid Phosphate.....	14.00	....	....
Rasin 13 Per Cent Acid Phosphate.....	13.00	....	....
Rasin's 10-4 Bone and Potash.....	10.00	....	4.00
Rasin Bone and Potash.....	10.00	....	2.00
Rasin Special Bone and Potash.....	10.00	....	....
Rasin Dixie Guano.....	9.00	1.65	2.00
Baltimore Special Mixture.....	9.00	.82	2.00
Rasin Gold Standard.....	8.00	2.47	3.00
Rasin's Indian Brand for Tobacco.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Rasin's General Tobacco Grower.....	8.00	2.06	3.00
Rasin Empire Guano.....	8.00	1.65	2.00
Rasin's Empire Truck Fertilizer.....	6.00	4.12	7.00

Read Phosphate Co., Charleston, S. C.—

Read's H. G. Dissolved Bone.....	16.00
Read's H. G. Acid Phosphate.....	14.00	....	....
Read's Bone and Potash.....	10.00	....	4.00
Read's Alkaline Bone.....	10.00	....	2.00
Read's Manipulated Guano.....	9.00	1.65	3.00
Read's Ammoniated Dissolved Bone.....	8.00	3.30	6.00
Read's H. G. Guano.....	8.00	3.30	4.00
Read's H. G. Tobacco Leaf.....	8.00	2.47	3.00
Read's H. G. Cotton Grower.....	8.00	2.47	3.00
Read's Soluble Fish Guano.....	8.00	1.65	2.00
Read's Blood and Bone Fertilizer, No. 1.....	8.00	1.62	2.00
Read's Special Potash Mixture.....	8.00	....	4.00
Nitrate of Soda.....	....	19.00	....
Muriate of Potash.....	....	....	48.00
German Kainit .....	....	....	12.00

Reidsville Fertilizer Co., Reidsville, N. C.—

Reidsville Acid Phosphate.....	16.00
Bone and Potash.....	10.00	....	4.00
Bone and Potash.....	10.00	....	2.00
Lion Brand Fertilizer.....	9.00	2.47	6.00
Reidsville Hustler	9.00	.82	2.00
Farmers Tobacco Fertilizer.....	8.00	3.00	3.00
Royal Fertilizer	8.00	2.47	3.00
Climax Fertilizer	8.00	2.06	3.00
Farmers Grain Guano.....	8.00	2.00	3.00
Broad Leaf Tobacco Guano.....	8.00	1.85	2.50
Banner Fertilizer	8.00	1.65	2.00
Champion Guano	8.00	1.65	2.00
Bone and Potash.....	8.00	....	4.00
Muriate of Potash.....	....	....	50.00
German Kainit .....	....	....	12.00

Rowan Chemical Co., Salisbury, N. C.—

Rowan Grain Chemicals.....	20.00	....	12.00
Rowan Tobacco Chemical.....Total	16.00	4.95	6.00
Rowan Tobacco, Cotton and Application Guano	16.00	4.93	6.00
Rowan 16 Per Cent Acid Phosphate.....	16.00	....	....
Rowan 14 Per Cent Acid Phosphate.....	14.00	....	....
Rowan 13 Per Cent Acid Phosphate.....	13.00	....	....
Rowan Success Guano.....Total	12.00	3.29	8.00
Rowan Bone and Potash.....	12.00	....	6.00
Rowan Bone and Potash.....	12.00	....	3.00
Rowan 12 Per Cent Acid Phosphate.....	12.00	....	....
Rowan Crop Grower.....	10.00	1.65	2.00
Rowan H. G. Bone and Potash.....	10.00	....	6.00
Rowan Bone and Potash.....	10.00	....	5.00
Rowan Grain Mixture.....	10.00	....	4.00
Rowan Bone and Potash.....	10.00	....	3.00
Rowan Bone and Potash.....	10.00	....	2.00
Rowan Special Tobacco Guano.....	9.00	2.47	3.00
Rowan Fish and Blood Guano.....	9.00	.82	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Rowan Top Dresser.....	8.00	7.44	3.00
Rowan Trucker's Favorite.....	8.00	5.77	5.00
Rowan Strict Middling Guano.....	8.00	3.29	6.00
All Crop Manure.....	8.00	3.29	4.00
Rowan Double Header Guano.....	8.00	2.47	3.00
Rowan Double Header Guano for Tobacco...	8.00	2.47	3.00
Rowan Manipulated Guano.....	8.00	2.47	2.00
Rowan Fish Guano.....	8.00	2.06	3.00
Rowan Fish Guano for Tobacco.....	8.00	2.06	3.00
Rowan Heavy Weight Tobacco Guano.....	8.00	2.06	2.00
Rowan Premium Guano.....	8.00	1.65	10.00
Rowan Special for Cotton and Tobacco.....	8.00	1.65	5.00
Rowan Complete Guano.....	8.00	1.65	3.00
Rowan Bone Guano.....	8.00	1.65	3.00
Rowan Double Quick Guano.....	8.00	1.65	2.00
Rowan Double Quick Guano for Tobacco....	8.00	1.65	2.00
Rowan Wheat Mixture.....	8.00	....	4.00
Rowan Truck Guano.....	7.00	3.29	5.00
Nitrate of Soda.....	....	14.82	....
Rowan Muriate of Potash.....	....	....	50.00
Rowan Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

*Swift Fertilizer Works, Atlanta, Ga., Wilmington,
N. C., and Chester, S. C.—*

Swift's Pure Raw Bone Meal.....Total	23.00	3.71
Swift's Pure Bone Meal.....Total	23.00	2.47	....
Swift's Pure Bone Meal, H. G.....Total	23.00	2.47	....
Swift's Special High Grade Acid Phosphate..	16.00	....	....
Swift's Cultivator High Grade Acid Phos- phate	14.00	....	....
Swift's Harrow Standard Grade Acid Phos- phate	13.00	....	....
Swift's Special High Grade Phosphate and Potash	12.00	....	6.00
Swift's Atlanta High Grade Phosphate and Potash	12.00	....	4.00
Swift's Chattahoochee Standard Grade Acid Phosphate	12.00	....	....
Swift's Farmers' Special H. G. G.....	10.00	3.29	4.00
Swift's Corn and Cotton Grower H. G. Guano.	10.00	2.47	3.00
Swift's Eagle High Grade Guano.....	10.00	1.65	2.00
Swift's Planters' Special Standard Grade Guano	10.00	.82	3.00
Swift's Plow Boy Guano.....	10.00	.82	1.00
Swift's Atlanta H. G. Phosphate and Potash.	10.00	....	5.00
Swift's Farmer's Home High Grade Phosphate and Potash	10.00	....	4.00
Swift's Field and Farm Standard Grade Phos- phate and Potash.....	10.00	....	2.00
Swift's Wheat Grower Standard Grade Phos- phate and Potash.....	10.00	....	2.00
Swift's Special High Grade Guano.....	9.50	4.12	3.00
Swift's Blood, Bone and Potash High Grade Guano	9.50	3.29	7.00
Swift's Cotton King High Grade Guano.....	9.00	2.47	2.00
Swift's Special Cotton Guano.....	9.00	2.26	2.00
Swift's Gold Medal C. S. M. Compound H. G. Guano	9.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Swift's Farmers' Favorite High Grade Guano.	9.00	1.65	3.00
Swift's Cotton Plant Standard Grade Guano.	9.00	1.65	1.00
Swift's Cape Fear Truck Guano, H. G.	8.00	4.12	2.00
Swift's Monarch H. G. Guano Vegetable Grower	8.00	3.29	4.00
Swift's Monarch C. S. M. Comp. H. G. G.	8.00	3.29	4.00
Swift's Strawberry Grower H. G. Guano.	8.00	2.47	10.00
Swift's Carolina Tobacco Grower H. G. Guano.	8.00	2.47	3.00
Swift's Ruralist High Grade Guano.	8.00	2.17	3.00
Swift's Plow Boy C. S. M. Compound H. G. Guano	8.00	2.47	3.00
Swift's Special Blood Guano for Cotton or To- bacco, H. G.	8.00	2.66	3.00
Braswell's Formula Standard Grade Guano..	8.00	2.06	2.50
Swift's Pioneer High Grade Guano Tobacco Grower	8.00	1.65	4.00
Clark's Special Cotton Grower, G. G.	8.00	1.65	3.00
Swift's Red Steer Standard Grade Guano....	8.00	1.65	2.00
Swift's Golden Harvest Standard Grade Guano	8.00	1.65	2.00
Thompson's Special Standard Grade Guano..	8.00	.82	5.00
Swift's Special Peanut Grower Standard Grade Guano	8.00	.82	4.00
Swift's Plantation Standard Grade Phosphate and Potash	8.00	....	4.00
Swift's Carolina 7 Per Cent Special Trucker H. G. Guano.	7.00	5.76	7.00
Swift's Special Irish Potato Grower H. G. Guano	7.00	4.12	8.00
Swift's Early Trucker H. G. Guano.	7.00	4.12	5.00
High Grade Swift's No. 1 Ground Tankage..	6.00	8.24	....
Swift's Special Trucker H. G. Guano.	6.00	5.76	5.00
Swift's Favorite Truck Guano H. G.	6.00	4.94	6.00
Swift's Special Potato Grower H. G. Guano..	6.00	4.12	7.00
Swift's Special Tobacco Grower H. G. Guano.	6.00	3.29	6.00
Swift's Special 10 Per Cent Blood and Bone Trucker H. G. Guano.	5.00	8.23	3.00
Swift's Excelsior Top Dresser H. G. Guano..	4.00	6.18	2.00
Swift's Pure Nitrate of Soda. ....	....	14.82	....
Swift's Ground Dried Blood. ....	....	13.18	....
Swift's Muriate of Potash. ....	....	....	50.00
Swift's Sulphate of Potash. ....	....	....	49.00
Swift's Pure German Kainit. ....	....	....	12.00

Southern Chemical Co., Inc., Roanoke, Va.—

Pride of Virginia	8.00	2.47	3.00
Valley Queen	8.00	1.65	10.00
Farmers' Joy	8.00	1.65	4.00
Our Favorite	8.00	1.65	2.00

Spartanburg Fertilizer Co., Spartanburg, S. C.—

Tiger Brand Acidulated Phosphate.	14.00	....	....
West's Potash Acid.	13.00	....	3.00
Gosnell's Plant Food.	10.50	2.46	2.00
N. C. Special.	10.50	1.65	8.00
Corn Formula	10.50	1.65	5.00
10-4	10.00	....	4.00
Dana's Best	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Melrose	10.00	....	2.00
Boll Buster	9.00	1.65	2.00
Glencoe	8.00	2.46	3.00
Cotton Compound	8.75	1.65	2.00
Potato Guano	7.00	2.46	7.00
Nitrate of Soda .....	....	14.81	....
Muriate of Potash .....	....	....	48.00

Scotland Neck Guano Co., Scotland Neck, N. C.—

Our 16 Per Cent Acid Phosphate	16.00	....	....
Our 14 Per Cent Acid Phosphate	14.00	....	....
Our Bone and Potash Mixture	10.00	....	4.00
Noah Biggs' Truck Guano	9.00	4.10	5.00
Biggs' Cotton-seed Meal Fish Scrap Guano	9.00	3.30	4.00
Josey's Cotton-seed Meal and Fish Scrap Tobacco Guano	9.00	2.47	3.00
Old Halifax Cotton-seed Meal and Fish Scrap Tobacco Guano	9.00	2.47	3.00
Our Cotton Growers C. S. M. and Fish Scrap Guano	9.00	2.05	2.50
Our Favorite Cotton-seed Meal Guano	9.00	1.65	2.00
Our Bright Tobacco Guano	8.00	2.47	3.00
Our Best Peanut Guano	5.50	1.23	5.50
K. Elite Top Dressing	3.00	7.40	3.50
Nitrate of Soda .....	....	15.50	....
Sulphate of Potash .....	....	....	48.00
Muriate of Potash .....	....	....	48.00
Our Genuine German Kainit .....	....	....	12.00

The Southern Exchange Co., Marton, N. C.—

S. E. C. Acid Phosphate	16.00	....	....
S. E. C. Acid Phosphate	14.00	....	....
S. E. C. Potash Mixture	10.00	....	4.00
S. E. C. Bone and Potash Mixture	10.00	....	2.00
Juicy Fruit Fertilizer	9.00	1.85	4.00
The Walnut Fertilizer	8.50	2.06	2.50
Melon Grower	8.00	4.11	7.00
McKimmion's Special Truck Formula	8.00	4.11	7.00
Two Fours Guano	8.00	3.29	4.00
Southern Exchange Co.'s Bright Tobacco Formula	8.00	2.47	4.00
That Big Stick Guano	8.00	2.47	4.00
Bull of the Woods Fertilizer	8.00	2.47	4.00
Jack's Best Fertilizer	8.00	2.47	3.00
Correct Cotton Compound	8.00	2.47	3.00
R. M. C. Special Crop Grower	8.00	2.47	3.00
Southern Exchange Co.'s Special Tobacco Fertilizer	8.00	1.65	3.00
Currie Crop Lifter	8.00	1.65	3.00
The Racer Guano	8.00	1.65	3.00
The Coon Guano	8.00	1.65	2.00
Nitrate of Soda .....	....	15.00	....
Muriate of Potash .....	....	....	49.00
Genuine German Kainit	12.00

Southern Cotton Oil Co., Charleston, S. C.—

Pioneer	7.00	3.62	5.00
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Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Smith, Ham & Co., Pikeville, N. C.—</i>			
Genuine German Kainit.....	....	....	12.00
<i>H. T. Shannonhouse, Hertford, N. C.—</i>			
H. T. Shannonhouse 16 Per Cent Acid Phosphate	16.00	....	....
H. T. Shannonhouse 11 Per Cent Acid Phosphate	14.00	....	....
Shannonhouse Bone and Potash.....	10.00	....	4.00
H. T. S. Full Value.....	8.00	3.29	4.00
Pride of Carolina.....	8.00	3.29	4.00
H. T. S. Favorite.....	8.00	3.29	4.00
Farmers' Tobacco Favorite.....	8.00	2.47	3.00
Nun Better	8.00	2.47	3.00
Shannonhouse Blood and Bone.....	8.00	2.47	3.00
Southern Pride	8.00	2.47	3.00
Carolina's Choice	8.00	2.47	3.00
Sunny South	8.00	2.47	3.00
H. T. S. Tobacco Grower.....	8.00	1.65	2.00
Shannonhouse Success	8.00	1.65	2.00
Square Deal	8.00	1.65	2.00
X. L. M. for Cotton and Corn.....	8.00	1.65	2.00
Farmers' Money Maker.....	8.00	1.65	2.00
P. D. Q. Truck Grower.....	6.00	4.11	5.00
Shannonhouse High Grade.....	6.00	4.11	5.00
Genuine German Kainit.....	....	....	12.00

*The Southern Cotton Oil Co., Charlotte District,
Concord, Charlotte, Davidson, Shelby, Gib-
son, Monroe and Wadesboro—*

Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate				16.00	....	....
Gold Seal				14.00	....	....
Silver King				13.00	....	....
Conqueror Bone and Potash.....				10.00	....	4.00
Magnolia Bone and Potash.....				10.00	....	2.00
Uncle Sam				9.00	2.47	3.00
Home Made				9.00	2.05	3.00
Razem				9.00	1.65	3.00
King Bee				8.83	1.65	2.00
Choice				8.00	3.30	6.00
Conqueror				8.00	3.30	4.00
Canto				8.00	3.29	6.00
Melonite				8.00	3.29	4.00
Peacock				8.00	2.47	3.00
Moon				8.00	2.47	3.00
Landsake				8.00	2.47	2.50
Red Bull				8.00	2.06	2.00
All-to-Good				8.00	2.05	3.00
Gloria				8.00	1.65	2.00
Double Two				8.00	1.65	2.00
Dandy Top Dresser.....				4.00	9.07	2.50
Peerless Top Dresser.....				4.00	6.17	2.50
Nitrate of Soda .....				....	15.00	....
Nitrate of Soda.....				....	13.20	....
Labi .....				....	8.99	17.00
Muriate of Potash.....				....	....	48.00
Sulphate of Potash.....				....	....	48.00
Genuine German Kainit.....				....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Southern Cotton Oil Co., Goldsboro, Fayetteville, Rocky Mount and Wilson—</i>			
Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	16.00	....	....
Southern Cotton Oil Co.'s 14 Per Cent Acid Phosphate	14.00	....	....
Best & Thompson's Special Cotton Grower...	9.00	2.27	2.00
Goldsboro Cotton Grower.....	9.00	2.27	2.00
Goldsboro Oil Mill Special Mixture.....	8.00	3.30	4.00
Fayetteville Oil Mill Special Mixture.....	8.00	3.30	4.00
Wilson Oil Mill Special Mixture.....	8.00	3.30	4.00
Rocky Mount Oil Mill Special Mixture.....	8.00	3.30	4.00
Southern Cotton Oil Co.'s Special Mixture...	8.00	3.30	4.00
Southern Cotton Oil Co.'s Melon Grower.....	8.00	2.47	10.00
Southern Cotton Oil Co.'s Special Cotton Grower	8.00	2.47	3.00
Best & Thompson's High Grade.....	8.00	2.47	3.00
Goldsboro Oil Mill Special Cotton Grower...	8.00	2.47	3.00
Fayetteville Oil Mill Special Cotton Grower...	8.00	2.47	3.00
Wilson Oil Mill Special Cotton Grower.....	8.00	2.47	3.00
Rocky Mount Oil Mill Special Cotton Grower...	8.00	2.47	3.00
B. G. Thompson's Special Cotton and Tobacco Guano	8.00	2.47	3.00
Egerton's Old Reliable.....	8.00	2.47	3.00
Morning Glory	8.00	2.47	3.00
Goldsboro Oil Mill High Grade.....	8.00	2.27	2.50
Fayetteville Oil Mill High Grade.....	8.00	2.27	2.50
Wilson Oil Mill High Grade.....	8.00	2.27	2.50
The Southern Cotton Oil Co. High Grade...	8.00	2.27	2.50
Southern Cotton Oil Co.'s Peanut Grower....	8.00	1.65	4.00
Goldsboro Oil Mill Standard.....	8.00	1.65	2.00
Fayetteville Oil Mill Standard.....	8.00	1.65	2.00
Wilson Oil Mill Standard.....	8.00	1.65	2.00
Rocky Mount Oil Mill Standard.....	8.00	1.65	2.00
The Southern Cotton Oil Co. Standard.....	8.00	1.65	2.00
Southern Cotton Oil Co. Truck Grower.....	6.00	4.12	7.00
<i>Southern Cotton Oil Co., Goldsboro, N. C.—</i>			
Rocky Mount Top Dresser.....	....	7.43	4.00
S. C. O. Co. Top Dresser.....	4.00	8.25	4.00
<i>Tidewater Guano Co., Norfolk, Va.—</i>			
Tidewater Raw Bone Meal.....Total	21.00	3.71	....
Top Rail Acid Phosphate.....	16.00	....	....
J. W. S. Acid Phosphate.....	13.00	....	....
Buster Brown Acid Phosphate.....	14.00	....	....
Tidewater Bone and Potash.....	10.00	....	5.00
Diana Brand Bone and Potash Compound...	10.00	....	4.00
Bully Boy Dissolved Bone and Potash.....	10.00	....	2.00
Diana Brand Soluble Guano.....	8.00	3.30	6.00
High Grade Soluble Guano for Tobacco.....	8.00	3.30	4.00
High Tide Soluble Guano.....	8.00	3.30	4.00
Sho Nuf Guano, H. G.....	8.00	2.47	3.00
Sho Nuf Guano High Grade Complete Manure for Tobacco	8.00	2.47	3.00
Hawk Eye Soluble Guano.....	8.00	2.07	2.00
"Hawk Eye" Soluble Guano for Tobacco.....	8.00	2.07	2.00
Soil King Special Guano.....	8.00	1.85	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
"Soil King" Special Guano for Tobacco.....	8.00	1.85	4.00
Double Action Soluble Guano.....	8.00	1.65	2.00
Double Action Soluble Guano for Tobacco....	8.00	1.65	2.00
"Good Money" Complete Guano.....	8.00	1.00	4.00
Tidewater 4-6-4 Guano.....	6.00	3.30	4.00
Nitrate of Soda.....	....	14.85	....
Blood .....	....	13.20	....
Fish .....	....	9.04	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

The Trotman Mfg. Co., Churchland, Va.—

Trotman's Special Mixture.....	8.00	2.46	3.00
Trotman's 2-8-2 Fertilizer.....	8.00	1.64	2.00

Tuscarora Fertilizer Co., Atlanta, Ga., and Wilmington, N. C.—

Acid Phosphate	16.00	....	....
Acid Phosphate	14.00	....	....
Acid Phosphate	13.00	....	....
Tuscarora Alkaline Bone.....	10.00	....	5.00
Tuscarora Acid and Potash.....	10.00	....	4.00
Tuscarora Bone and Potash.....	10.00	....	2.00
Tuscarora Chief	9.00	1.65	3.00
Tuscarora Truckee	8.00	4.11	7.00
Fertilizer, No. 844.....	8.00	3.30	4.00
Boon's Special	8.00	2.47	4.00
Tobacco Special	8.00	2.47	3.00
Cotton Special	8.00	2.47	3.00
Berry King	8.00	2.05	4.00
Tuscarora Tobacco Fertilizer.....	8.00	2.05	3.00
King Cotton	8.00	2.05	2.00
Tuscarora Champion	8.00	2.05	2.50
Tuscarora Champion Tobacco Grower.....	8.00	2.05	2.50
Tuscarora Fruit and Potato.....	8.00	1.65	10.00
Tuscarora Fertilizer, No. 8-2-5.....	8.00	1.65	5.00
Tuscarora Standard	8.00	1.65	2.00
Tuscarora Standard Tobacco Grower.....	8.00	1.65	2.00
Tuscarora Bone and Potash.....	8.00	....	4.00
Big Four (4) Fertilizer.....	7.00	1.65	4.00
Manure Substitute	6.00	3.30	4.00
Nitrate of Soda.....	....	14.81	....
Tuscarora Top Dresser.....	....	7.83	4.00
Sulphate of Potash.....	....	....	50.00
Muriate of Potash.....	....	....	48.00
Kainit .....	....	....	12.00

Union Guano Co., Winston-Salem, N. C.—

Pure Raw Animal Bone Meal.....Total	22.50	3.71	....
Pure Animal Bone Meal.....Total	22.50	2.47	....
Union 16 Per Cent Acid Phosphate.....	16.00	....	....
Union High Grade Acid Phosphate.....	14.00	....	....
Union Dissolved Animal Bone.....Total	13.00	2.06	....
Union Dissolved Bone.....	13.00	....	....
Union 12-6 Bone and Potash.....	12.00	....	6.00
Union 12-5 Bone and Potash.....	12.00	....	5.00
Union 12-4 Bone and Potash.....	12.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Union 12-3 Bone and Potash.....	12.00	....	3.00
Union 12-2 Bone and Potash.....	12.00	....	2.00
Union 12 Per Cent Acid Phosphate.....	12.00	....	....
Liberty Bell Crop Grower.....	10.50	....	1.50
Union Prolific Cotton Compound.....	10.00	3.29	4.00
Union Special Formula for Cotton.....	10.00	2.47	3.00
Union Mule Brand Guano.....	10.00	1.65	2.00
Union 10-6 Bone and Potash.....	10.00	....	6.00
Union 10-5 Bone and Potash.....	10.00	....	5.00
Union 10-4 Bone and Potash.....	10.00	....	4.00
Quakers' Grain Mixture.....	10.00	....	4.00
Giant Phosphate and Potash.....	10.00	....	3.00
Finch & Harris's Special Bone and Potash Mixture	10.00	....	3.00
Union Bone and Potash.....	10.00	....	2.00
Union Renown Guano.....	9.00	2.47	3.00
Union Perfect Cotton Grower.....	9.00	2.26	2.00
Union Complete Cotton Mixture.....	9.00	1.65	3.00
Farmers' Blood and Bone Guano.....	9.00	1.65	3.00
Dixie Cotton Grower.....	9.00	1.65	2.00
Q. and Q. (Quality and Quantity) Guano....	9.00	1.65	1.00
"B. S." Ammoniated Guano.....	9.00	.82	3.00
Union Approved Crop Grower.....	8.75	1.65	2.00
Union Guano for Cotton and Tobacco.....	8.00	3.29	6.00
Union Premium Guano.....	8.00	3.29	4.00
Union Homestead Guano.....	8.00	2.47	3.00
Victoria High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Union Water Fowl Guano.....	8.00	2.06	3.00
Union Standard Tobacco Grower.....	8.00	2.06	2.00
Union Potato Mixture.....	8.00	1.65	10.00
Christian's Special Tobacco Grower.....	8.00	1.65	3.00
Old Honesty Guano.....	8.00	1.65	2.00
Old Honesty Tobacco Guano.....	8.00	1.65	2.00
Fish Brand Ammoniated Guano.....	8.00	1.65	2.00
Union Superlative Guano.....	8.00	.82	4.00
Sunrise Ammoniated Guano.....	8.00	.82	3.00
Union 8-5 Bone and Potash.....	8.00	....	5.00
Union Wheat Mixture.....	8.00	....	4.00
Union Vegetable Compound.....	7.00	4.12	8.00
Union Truck Guano.....	7.00	3.29	5.00
Complete Mixture for Top Dressing.....	4.00	6.18	4.00
Special 10 Per Cent Top Dresser.....	2.00	8.24	2.50
Nitrate of Soda.....	....	14.83	....
Union Top Dresser.....	....	7.42	3.00
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

United States Fertilizer Co., Baltimore, Md.—

Raw Bone Meal.....Total	20.50	3.20	....
Farm Bell Acid Phosphate.....	16.00	....	....
Farm Bell Acid Phosphate.....	14.00	....	....
Farm Bell Phospho. Potasso.....	12.00	....	5.00
Farm Bell Potash and Acid.....	10.00	....	6.00
Farm Bell Special Mixture.....	10.00	....	4.00
Farm Bell Alkaline Mixture.....	10.00	....	2.00
Farm Bell Big Yield.....	9.00	2.47	4.00
Farm Bell Buckeye Guano.....	9.00	.82	2.00
Excelsior Guano 4-8-7.....	8.00	3.28	7.00

Name and Address of Manufacturer and Name of Brand.	Avall. Phos. Acid.	Nitrogen.	Potash.
Farm Bell Majestic Guano.....	8.00	3.28	4.00
Farm Bell Cotton Special.....	8.00	2.47	3.00
Farm Bell Tobacco Special.....	8.00	2.47	3.00
Tobacco Fertilizer 3-8-1.....	8.00	2.46	4.00
Farm Bell Crop Grower.....	8.00	2.06	3.00
Farm Bell Fruit and Potato.....	8.00	1.65	10.00
Farm Bell Animal Ammoniated.....	8.00	1.65	5.00
Farm Bell Standard Guano.....	8.00	1.65	2.00
Farm Bell Pennant Winner.....	8.00	.82	4.00
Farm Bell Phosphate and Potash.....	8.00	....	5.00
Farm Bell Trucker's Ideal.....	7.00	4.11	8.00
Farm Bell Potato and Tobacco Guano.....	7.00	2.47	10.00
Farm Bell 7 Per Cent Trucker.....	6.00	5.75	5.00
Farm Bell Trucker's Favorite.....	6.00	3.28	8.00
Top Dresser.....	4.00	6.56	2.00
Nitrate of Soda.....	....	15.50	....
Muriate of Potash.....	....	....	48.00
Kainit.....	....	....	12.00

Union Abattoir Co., Baltimore, Md., and Richmond, Va.—

Pure Bone and Potash Compound.....	16.00	1.65	2.50
Red Star Acid Phosphate.....	16.00	....	....
Red Star Acid Phosphate.....	14.00	....	....
Pure Dissolved Animal Bone.....	12.00	1.65	....
Red Star Potash and Soluble Bone.....	12.00	....	5.00
Potash and Soluble Bone (Red Star).....	12.00	....	3.00
Red Star Potash and Soluble Bone.....	10.00	....	5.00
Red Star Potash and Soluble Bone.....	10.00	....	2.00
Red Star Brand Tobacco Compound.....	9.00	3.27	2.00
Red Star Brand Cotton Guano.....	8.00	3.28	4.00
Red Star Early Truck and Tobacco Guano...	8.00	3.28	4.00
Red Star Cotton and Tobacco Guano.....	8.00	2.46	3.00
Red Star Tobacco Fertilizer.....	8.00	2.05	2.00
Red Star Cotton Guano.....	8.00	1.65	2.00
Red Star Standard.....	8.00	1.65	2.00
Red Star Grain and Grass.....	8.00	1.00	4.00
Red Star Peanut Grower.....	8.00	1.00	4.00
Red Star Potato Manure.....	7.00	2.46	10.00
Red Star Special Guano.....	7.00	2.46	5.00
Red Star 7 Per Cent Guano.....	6.00	5.74	5.00
Early Truck and Potato Guano.....	6.00	4.10	7.00
Nitrate of Soda.....	....	15.58	....
Muriate of Potash.....	....	....	48.00
German Kainit.....	....	....	12.00

R. L. Upshur, Norfolk, Va.—

Upshur's 16 Per Cent Acid Phosphate.....	16.00	....	....
Upshur's High Grade Acid Phosphate.....	14.00	....	....
Upshur's Wheat Compound.....	12.00	....	5.00
Upshur's High Grade Bone and Potash Special.	10.00	....	4.00
Upshur's Bone and Potash Guano.....	10.00	....	2.00
Cotton-seed Meal Mixture.....	9.00	2.26	2.00
Upshur's O. P. (Old Plantation).....	9.00	1.65	2.00
Upshur's Special.....	8.00	3.30	4.00
Upshur's 8-3-3 Cotton.....	8.00	2.47	3.00
Upshur's High Grade Tobacco Guano.....	8.00	2.47	3.00
Upshur's Special 2½-8-3.....	8.00	2.05	3.00
Upshur's F. F. V. (Favorite Fertilizer of Virginia)	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Upshur's Peanut Guano.....	8.00	1.65	* 2.00
Upshur's G. G. & C. Guano.....	8.00	1.65	2.00
Premo Cotton Guano.....	8.00	1.65	2.00
Upshur's Fish, Bone and Potash.....	8.00	1.64	4.00
Upshur's Special Truck Guano.....	7.00	4.11	8.00
Upshur's F. F. (Farmers' Favorite).....	7.00	4.11	6.00
Upshur's New Process Guano.....	6.00	6.58	8.00
Upshur's F. C. (Farmers' Challenge).....	6.00	5.76	6.00
Upshur's 7 Per Cent Irish Potato Guano.....	6.00	5.76	5.00
Upshur's 4-6-4 Tobacco Special.....	6.00	3.69	4.00
Upshur's Norfolk Special 10 Per Cent.....	5.00	8.23	2.00
Upshur's Special Potato Guano.....	5.00	5.76	5.00
Upshur's 5 Per Cent.....	5.00	4.11	5.00
Nitrate of Soda.....	....	15.22	....
Ground Fish.....	....	9.04	....
Ground Tankage.....	....	6.58	....
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
Genuine German Kainit.....	....	....	12.00

Venable Fertilizer Co., Richmond, Va.—

Pure Animal Bone.....Total	25.00	2.47	....
Pure Raw Bone.....Total	22.50	3.70	....
Venable Best Acid Phosphate.....	16.00	....	....
H. G. Acid Phosphate.....	14.00	....	....
Venable's Dissolved Bone.....	13.00	....	....
Venable's Standard Acid Phosphate.....	12.00	....	....
Venable's Corn, Wheat and Grass Fertilizer..	10.00	.82	1.00
High Grade Bone and Potash Mixture.....	10.00	....	4.00
Bone and Potash Mixture.....	10.00	....	2.00
Venable's Carolina Favorite.....	9.00	2.47	6.00
Roanoke Mixture.....	9.00	2.26	2.00
Roanoke Meal Mixture.....	9.00	2.26	2.00
Venable's B. B. P. Manure.....	9.00	1.65	1.00
Venable's 5 Per Cent Trucker.....	8.00	4.11	5.00
Venable's 4 Per Cent Trucker.....	8.00	3.29	4.00
Venable's H. G. Tobacco Fertilizer.....	8.00	2.47	3.00
Ballard's Choice Fertilizer.....	8.00	2.47	3.00
Venable's Alliance Tobacco Manure, No. 1....	8.00	2.06	3.00
Venable's Cotton Grower.....	8.00	2.06	3.00
Venable's Roanoke Special.....	8.00	2.06	3.00
Venable's Ideal Manure.....	8.00	1.65	5.00
Our Union Tobacco Fertilizer.....	8.00	1.65	4.00
Venable's Meal Mixture.....	8.00	1.65	2.00
Venable's Alliance Tobacco Manure, No. 2....	8.00	1.65	2.00
Venable's Meal Mixture.....	8.00	1.65	2.00
Our Union Special Fertilizer.....	8.00	1.65	2.00
Planters' Bone Fertilizer.....	8.00	1.65	2.00
Venable's Peanut Special.....	8.00	.82	4.00
Venable's Alliance Bone and Potash Mixture..	8.00	....	4.00
Venable's Peanut Grower.....	8.00	....	4.00
Venable's 10 Per Cent Trucker.....	6.00	8.23	2.00
Venable's 6-6-6 Manure.....	6.00	4.94	6.00
Nitrate of Soda.....	....	15.63	....
Special Top Dresser.....	....	7.30	3.00
Muriate of Potash.....	....	....	50.00
Sulphate of Potash.....	....	....	48.00
H. G. German Potash.....	....	....	16.00
Pure German Kainit.....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash
<i>Vance Guano Co., Henderson, N. C.—</i>			
Best Grade Acid Phosphate.....	16.00	.....	.....
Vance High Grade Acid Phosphate.....	14.00	.....	.....
Vance Corn and Grain Grower.....	10.00	.82	3.50
Bone and Potash Compound.....	10.00	.....	2.00
Farmers' Union High Grade.....	9.00	2.47	3.00
Brodie's Best B. B.....	8.00	3.29	4.00
Fish Brand Tobacco Manure.....	8.00	2.47	3.00
Sterling Cotton Grower, V. C. C.....	8.00	1.65	2.00
Hot Stuff	8.00	1.65	2.00
Vance Top Dresser.....	3.00	8.23	5.00
<i>Virginia-Carolina Chemical Co., Richmond, Va.—</i>			
V.-C. C. Co.'s 17 Per Cent Acid Phosphate....	17.00	.....	.....
V.-C. C. Co.'s 16 Per Cent Acid Phosphate....	16.00	.....	.....
V.-C. C. Co.'s 14 Per Cent Acid Phosphate....	14.00	.....	.....
V.-C. C. Co.'s Special High Grade Potash Mix- ture	12.00	.....	6.00
V.-C. C. Co.'s H. G. Potash Mixture.....	12.00	.....	5.00
V.-C. C. Co.'s 12-4 Grain Grower.....	12.00	.....	4.00
V.-C. C. Co.'s Special Crop Grower.....	12.00	.....	3.00
V.-C. C. Co.'s Grain Special.....	10.00	.....	6.00
V.-C. C. Co.'s Standard Bone and Potash....	10.00	.....	5.00
V.-C. C. Co.'s Special Potash Mixture.....	10.00	.....	4.00
V.-C. C. Co.'s Dissolved Bone and Potash....	10.00	.....	2.00
V.-C. C. Co.'s Vececo Cotton Grower.....	9.00	2.26	2.00
V.-C. C. Co.'s Cotton Grower.....	9.00	2.26	2.00
V.-C. C. Co.'s Farmers' Choice.....	8.00	3.29	4.00
V.-C. C. Co.'s Special.....	8.00	3.29	4.00
V.-C. C. Co.'s High Grade Tobacco Fertilizer.	8.00	2.47	10.00
V.-C. C. Co.'s Monarch Brand.....	8.00	1.65	5.00
V.-C. C. Co.'s Corn and Peanut Special.....	8.00	1.65	4.00
V.-C. C. Co.'s Special Peanut Grower.....	8.00	1.00	4.00
V.-C. C. Co.'s Peanut Grower.....	8.00	.82	4.00
V.-C. C. Co.'s Potash Mixture for Peanuts....	8.00	.....	4.00
V.-C. C. Co.'s Truck Crop Fertilizer.....	7.00	4.12	7.00
V.-C. C. Co.'s Potash Potato Producer.....	7.00	3.29	8.00
V.-C. C. Co.'s Formula 44 for Bright Wrappers and Smokers	7.00	2.55	3.30
V.-C. C. Co.'s Plant Bed and High Grade....	7.00	2.26	6.00
V.-C. C. Co.'s Special Truck Guano.....	6.00	4.12	7.00
V.-C. C. Co.'s High Grade Top Dresser.....	4.00	6.17	2.50
H. G.	4.00	8.24	4.00
V.-C. C. Co.'s Special Top Dresser.....	.....	7.40	3.00
Johnston's Best	20.00	4.94	6.00
Sludge Acid Phosphate.....	14.00	.....	.....
Goodman's Special Potash Mixture.....	12.00	.....	5.00
Battle's Crop Grower.....	12.00	.....	3.00
Home Comfort Acid Phosphate.....	12.00	.....	.....
Virginia 11-5 Bone and Potash.....	11.00	.....	5.00
Ideal Crop Grower.....	10.00	2.46	3.00
Sovereign Crop Producer.....	10.00	1.65	2.00
Ford's Wheat and Corn Guano.....	10.00	.82	2.50
Great Texas Cotton Grower Soluble Guano..	9.00	2.47	4.00
Jeffrey's High Grade Guano.....	9.00	2.47	3.00
N. and R.'s Best.....	9.00	2.47	3.00
Southern Cotton Grower.....	9.00	2.29	2.00
Best's Special Cotton Grower.....	9.00	2.26	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Powell's Special H. G. C. S. M.....	9.00	2.26	3.00
Prolific Cotton Grower.....	9.00	2.26	2.00
White Stem C. S. M.....	9.00	2.26	2.00
Standard Cotton Grower C. S. M.....	9.00	2.26	2.00
Bumper Crop Guano.....	9.00	2.06	5.00
Cuban Special Mixture.....	9.00	1.85	4.00
Cock's Soluble Guano High Grade Animal Bone	9.00	1.85	3.00
No. 923 Guano.....	9.00	1.65	3.00
Reliable Cotton Brand Fertilizer.....	9.00	1.65	3.00
North State Guano C. S. M.....	9.00	1.65	1.00
Bigelow's Crop Guano.....	9.00	.82	3.00
Burnhardt's Grain and Crop Guano.....	9.00	.82	3.00
McCormick's Wheat and Grain Guano.....	9.00	.82	3.00
Farmers' Friend Favorite Fertilizer Special..	8.50	1.65	2.00
Nowell's Special	8.00	3.29	4.00
Farmers' Success	8.00	2.47	4.00
Powhatan Crop Mixture.....	8.50	1.65	1.50
Pelican Peruvian Guano (1,000 pounds Genu- ine Peruvian Guano to the ton).....	8.00	4.12	5.00
Muse's Special	8.00	3.70	7.00
Croom's Crop Grower.....	8.00	3.29	4.00
John F. Croom & Bro. Fish and Meal Mixture. Fish and Meal Mixture.....	8.00	3.29	4.00
Carr's 8-4-4 Crop Grower.....	8.00	3.29	4.00
Lion's High Grade Tobacco Fertilizer.....	8.00	2.47	4.00
Croom's Special Cotton Fertilizer.....	8.00	2.47	3.00
Menhaden Fish and Meal Mixture.....	8.00	2.47	3.00
Best's H. G. Cotton and Tobacco Grower.....	8.00	2.47	3.00
Diamond C. S. M. Guano.....	8.00	2.47	3.00
Junbo Peruvian Guano (1,000 pounds Genu- ine Peruvian Guano to the ton).....	8.00	2.47	3.00
Oldham's Special Compound for Tobacco, High Grade	8.00	2.47	3.00
Blake's Best	8.00	2.47	3.00
Royal High Grade Fertilizer.....	8.00	2.47	3.00
Special High Grade Tobacco Fertilizer.....	8.00	2.47	3.00
Adams' Special	8.00	2.47	3.00
Peruvian H. G. Tobacco Guano.....	8.00	2.47	3.00
Red Cliffe H. G. Cotton Grower.....	8.00	2.47	3.00
Zeno Special Compound for Tobacco, H. G....	8.00	2.47	3.00
Gold Medal H. G. Tobacco Guano.....	8.00	2.47	3.00
Atlas Guano C. S. M.....	8.00	2.47	2.50
3 Per Cent Special C. S. M. Guano, No. 3....	8.00	2.47	2.00
Pace's 5 Per Cent Special Potato Guano.....	8.00	1.65	5.00
Oldham's Soluble Tobacco Guano.....	8.00	1.65	2.00
The Harvester	8.00	.82	3.00
Pinnale Grain Grower.....	8.00	.82	3.00
Pure Animal Bone Meal.....Total	23.00	2.47	....
Pure Raw Bone Meal.....Total	21.50	3.71	....
Dissolved Animal Bone.....	13.00	2.06	....
Myatt's Special High Grade Fertilizer.....	8.00	2.47	3.00
Admiral	8.00	2.47	2.50
Good Luck C. S. M.....	8.00	2.47	2.50
Split Silk C. S. M.....	8.00	2.47	2.50
Orange Grove Guano.....	8.00	2.26	2.50
Delta C. S. M.....	8.00	2.26	2.50
Royal Crown	8.00	2.26	2.00
Blue Star C. S. M.....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Superlative C. S. M. Guano.....	8.00	2.06	3.00
Smith's Irish Potato Guano.....	8.00	1.65	10.00
Winston Special for Cotton C. S. M.....	8.00	1.65	2.00
Diamond Dust C. S. M.....	8.00	1.65	2.00
Plant Food C. S. M.....	8.00	1.65	2.00
Wilson's Standard C. S. M.....	8.00	1.65	2.00
Ajax C. S. M. Guano.....	8.00	1.65	2.00
Farmers' Favorite Fertilizer C. S. M.....	8.00	1.65	2.00
Jones' Grain Special.....	8.00	....	4.00
Konqueror H. G. Truck Fertilizer.....	7.00	4.12	5.00
Pasquotank Trucker	7.00	3.29	8.00
Invincible High Grade Fertilizer.....	6.00	4.12	7.00
Kitty Hawk Truck Fertilizer.....	6.00	4.12	7.00
Dewberry's Special	4.00	6.59	....
Sulphate of Ammonia .....	....	20.59	....
Nitrate of Soda.....	....	14.82	....
Fish Scrap .....	....	8.24	....
Muriate of Potash.....	....	....	49.00
Sulphate of Potash.....	....	....	48.00
Manure Salts .....	....	....	12.00
Genuine German Kahlit.....	....	....	12.00
Allison & Addison's Fulton Acid Phosphate..	14.00	....	....
Allison & Addison's I. X. L. Acid Phosphate.	13.00	....	....
Allison & Addison's Standard Acid Phosphate.	12.00	....	....
Allison & Addison's Rocketts Acid Phosphate.	12.00	....	....
Allison & Addison's B. P. Potash Mixture...	10.00	....	2.00
Allison & Addison's McGavock's Special Potash Mixture	10.00	....	2.00
Allison & Addison's Star Special Tobacco Manure	9.00	2.26	2.00
Allison & Addison's Star Brand Special H. G.	9.00	2.06	5.00
Allison & Addison's Star Brand Guano.....	9.00	1.65	1.00
Allison & Addison's Little Giant Grain and Grass Grower	9.00	.82	2.00
Allison & Addison's Anchor Brand Tobacco Fertilizer	8.50	2.26	2.00
Allison & Addison's Star Brand Vegetable Guano	8.00	3.70	4.00
Allison & Addison's A. A. Guano.....	8.00	2.47	3.00
Allison & Addison's Anchor Brand Fertilizer.	8.00	1.65	2.00
Allison & Addison's Old Hickory Guano.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Acid Phosphate	16.00	....	....
Atlantic and Virginia Fertilizer Co.'s Valley of Virginia Phosphate.....	14.00	....	....
Atlantic and Virginia Fertilizer Co.'s Crenshaw Acid Phosphate.....	13.00	....	....
Atlantic and Virginia Fertilizer Co.'s Our Acid Phosphate	12.00	....	....
Atlantic and Virginia Fertilizer Co.'s Eureka Bone and Potash Compound.....	10.00	....	2.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone Special for Tobacco.....	9.00	2.06	2.00
Atlantic and Virginia Fertilizer Co.'s Orient Complete Manure	9.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Virginia Truckers	8.00	4.12	5.00
Atlantic and Virginia Fertilizer Co.'s Eureka Ammoniated Bone	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Atlantic and Virginia Fertilizer Co.'s Orient Special for Tobacco.....	8.00	1.65	2.00
Atlantic and Virginia Fertilizer Co.'s Carolina Truckers	7.00	5.76	7.00
Charlotte Oil and Fertilizer Co.'s 15 Per Cent Acid Phosphate	15.00	....	....
Charlotte Oil and Fertilizer Co.'s Catawba Bone Phosphate	14.00	....	....
Charlotte Oil and Fertilizer Co.'s Charlotte Acid Phosphate	13.00	....	....
Charlotte Oil and Fertilizer Co.'s Dayvault's Special	12.00	....	6.00
Charlotte Oil and Fertilizer Co.'s Charlotte Dissolved Bone	12.00	....	....
Charlotte Oil and Fertilizer Co.'s Oliver's Per- fect Wheat Grower.....	11.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s 10-2 Bone and Potash	10.00	....	2.00
Charlotte Oil and Fertilizer Co.'s High Grade Special Tobacco Fertilizer.....	9.00	2.06	2.00
Charlotte Oil and Fertilizer Co.'s Queen of the Harvest C. S. M.....	9.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s McCrary's Diamond Bone and Potash.....	9.00	....	3.00
Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fertilizer.....	8.00	2.47	4.00
Charlotte Oil and Fertilizer Co.'s Catawba Guano B. G.....	8.00	2.47	3.00
Charlotte Oil and Fertilizer Co.'s Special 3 Per Cent Guano C. S. M.....	8.00	2.47	2.00
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano B. G.....	8.00	2.06	1.50
Charlotte Oil and Fertilizer Co.'s Charlotte Ammoniated Guano C. S. M.....	8.00	2.06	1.50
Charlotte Oil and Fertilizer Co.'s The Leader B. G.	8.00	1.65	2.00
Charlotte Oil and Fertilizer Co.'s King Cotton Grower	8.00	1.65	2.00
Davie & Whittle's Owl Brand High Grade Acid Phosphate	16.00	....	....
Davie & Whittle's Owl Brand High Grade Dissolved Bone	14.00	....	....
Davie & Whittle's Owl Brand Acid Phosphate.	13.00	....	....
Davie & Whittle's Owl Brand Dissolved Bone.	12.00	....	....
Davie & Whittle's Owl Brand Acid Phosphate with Potash	10.00	....	2.00
Davie & Whittle's Owl Brand High Grade 3 Per Cent Soluble Guano.....	9.00	2.06	3.00
Davie & Whittle's Owl Brand Special Tobacco Guano	9.00	2.06	2.00
Davie & Whittle's Owl Brand Truck Guano..	8.00	4.94	5.00
Davie & Whittle's Owl Brand Guano for To- bacco	8.00	2.47	3.00
Davie & Whittle's Vinco Guano.....	8.00	1.65	3.00
Davie & Whittle Owl Brand Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Durham Best Acid Phosphate	16.00	....	....
Durham Fertilizer Co.'s Standard High Grade Acid Phosphate	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Durham Fertilizer Co.'s Excelsior Dissolved Bone Phosphate	14.00	....	....
Durham Fertilizer Co.'s Blacksburg Dissolved Bone	13.00	....	....
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Acid Phosphate.....	13.00	....	....
Durham Fertilizer Co.'s Double Bone Phosphate	13.00	....	....
Durham Fertilizer Co.'s Durham Acid Phosphate	12.00	....	....
Durham Fertilizer Co.'s Great Wheat and Corn Grower	10.50	....	1.50
Durham Fertilizer Co.'s Diamond Wheat Mixture	10.00	....	3.00
Durham Fertilizer Co.'s Standard Wheat and Corn Grower	10.00	....	2.00
Durham Fertilizer Co.'s Blue Ridge Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Standard Wheat Grower	10.00	....	2.00
Durham Fertilizer Co.'s Durham Bone and Potash Mixture	10.00	....	2.00
Durham Fertilizer Co.'s L. & M. Special....	9.00	2.47	2.00
Durham Fertilizer Co.'s Standard Guano....	9.00	1.65	2.00
Durham Fertilizer Co.'s Durham Ammoniated Fertilizer	9.00	1.65	1.00
Durham Fertilizer Co.'s Special Plant and Truck Fertilizer	8.00	4.12	3.00
Durham Fertilizer Co.'s Durham High Grade.	8.00	3.29	4.00
Durham Fertilizer Co.'s Gold Medal Brand Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s Yellow Leaf Tobacco Guano	8.00	2.47	3.00
Durham Fertilizer Co.'s N. C. Farmers' Alliance Official Guano.....	8.00	2.06	3.00
Durham Fertilizer Co.'s Pride of Durham Tobacco Grower	8.00	2.06	3.00
Durham Fertilizer Co.'s Raw Bone Superphosphate for Tobacco.....	8.00	2.06	2.00
Durham Fertilizer Co.'s Raw Bone Superphosphate	8.00	2.06	1.50
Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Genuine Bone and Peruvian Tobacco Guano.....	8.00	1.65	2.00
Durham Fertilizer Co.'s Blacksburg Soluble Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Progressive Farmer Guano	8.00	1.65	2.00
Durham Fertilizer Co.'s Carr's Special Wheat Grower	8.00	....	4.00
Durham Fertilizer Co.'s Best Potato Manure.	7.00	5.76	7.00
Lynchburg Guano Co.'s Ironside Acid Phosphate	16.00	....	....
Lynchburg Guano Co.'s Lynchburg High Grade Acid Phosphate	14.00	....	....
Lynchburg Guano Co.'s Arvonja Acid Phosphate	13.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Lynchburg Guano Co.'s Spartan Acid Phosphate	12.00	....	....
Lynchburg Guano Co.'s Alpine Mixture.....	10.00	....	5.00
Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture.....	10.00	....	4.00
Lynchburg Guano Co.'s Dissolved Bone and Potash	10.00	....	2.00
Lynchburg Guano Co.'s Independent Standard.	8.50	1.65	2.00
Lynchburg Guano Co.'s Bright Belt Guano..	8.00	2.47	3.00
Lynchburg Guano Co.'s Solid Gold Tobacco..	8.00	2.26	4.00
Lynchburg Guano Co.'s New Era.....	8.00	1.65	3.00
Lynchburg Guano Co.'s Lynchburg Soluble..	8.00	1.65	2.00
Lynchburg Guano Co.'s Lynchburg Soluble for Tobacco	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Reliable Acid Phosphate.....	14.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Best Acid Phosphate.....	13.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Soluble Bone	12.00	....	....
Norfolk and Carolina Chemical Co.'s Norfolk Bone and Potash.....	10.00	....	2.00
Norfolk and Carolina Chemical Co.'s Norfolk Truckee and Tomato Grower.....	8.00	4.12	5.00
Norfolk and Carolina Chemical Co.'s Amazon High Grade Manure.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Amazon H. G. Special Tobacco Guano.....	8.00	2.47	3.00
Norfolk and Carolina Chemical Co.'s Cooper's Bright Tobacco Fertilizer.....	8.00	2.06	3.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Made Especially for Tobacco	8.00	2.06	2.00
Norfolk and Carolina Chemical Co.'s Peanut Grower	8.00	1.00	4.00
Norfolk and Carolina Chemical Co.'s Crescent Brand Ammoniated Fertilizer.....	8.00	1.65	2.00
Norfolk and Carolina Chemical Co.'s Genuine Slaughter House Bone Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s High Grade Acid Phosphate	14.00	....	....
Old Dominion Guano Co.'s Bone Phosphate..	13.00	....	....
Old Dominion Guano Co.'s Royster's Acid Phosphate	12.00	....	....
Old Dominion Guano Co.'s Obelisk Brand Bone and Potash.....	10.00	....	4.00
Old Dominion Guano Co.'s Planter's Bone and Potash Mixture	10.00	....	3.00
Old Dominion Guano Co.'s Old Dominion Alkaline Bone and Potash.....	10.00	....	2.00
Old Dominion Guano Co.'s Horne's Cotton Fertilizer	9.00	2.06	3.00
Old Dominion Guano Co.'s Standard Raw Bone Soluble Guano.....	9.00	1.65	1.00
Old Dominion Guano Co.'s Farmers' Friend High Grade Fertilizer.....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Dominion Guano Co.'s Farmers' Friend Special Tobacco Fertilizer.....	8.00	2.17	3.00
Old Dominion Guano Co.'s Osceola Tobacco Guano	8.00	2.06	3.00
Old Dominion Guano Co.'s Farmers' Friend Fertilizer	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Spe- cial Wheat Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Sol- uble Tobacco Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Old Dominion Sol- uble Tobacco Guano.....	8.00	1.65	2.00
Old Dominion Guano Co.'s Bullock's Cotton Grower	8.00	1.65	2.00
Old Dominion Guano Co.'s Miller's Special Wheat Mixture	8.00	....	4.00
Old Dominion Guano Co.'s Old Dominion 7-7-7 Truck Guano	7.00	5.76	7.00
Old Dominion Guano Co.'s Old Dominion Po- tato Manure	7.00	4.12	8.00
Old Dominion Guano Co.'s 7 Per Cent Truck Fertilizer	6.00	5.76	6.00
Old Dominion Guano Co.'s Old Dominion 6-7-5 Truck Guano	6.00	5.76	5.00
Old Dominion Guano Co.'s Old Dominion Spe- cial Sweet Potato Guano.....	6.00	1.65	6.00
Old Dominion Guano Co.'s 70 Per Cent Truck Fertilizer	5.00	8.24	2.50
Powers, Gibbs & Co.'s Almont High Grade Acid Phosphate	14.00	....	....
Fulp's Acid Phosphate.....	13.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Best Acid Phosphate	13.00	....	....
Almont Acid Phosphate.....	12.00	....	....
Powers, Gibbs & Co.'s Cotton Brand Acid Phosphate	12.00	....	....
Powers, Gibbs & Co.'s Acid Phosphate and Potash	10.50	....	1.50
Powers, Gibbs & Co.'s Almont Wheat Mixture. Powers, Gibbs & Co.'s Dissolved Bone and Potash	10.00	....	3.00
Powers, Gibbs & Co.'s Cotton-seed Meal Stand- ard Guano	10.00	....	2.00
Powers, Gibbs & Co.'s Truck Farmers' Special Ammoniated Guano	9.00	2.47	2.00
Powers, Gibbs & Co.'s Cotton Brand Ammoni- ated Dissolved Bone.....	8.00	3.29	5.00
Powers, Gibbs & Co.'s Old Kentucky High Grade Manure	8.00	3.29	4.00
Powers, Gibbs & Co.'s Old Kentucky High Grade Manure	8.00	2.47	3.00
Powers, Gibbs & Co.'s Cotton Belt Ammoniated Guano	8.00	2.47	2.00
Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.....	8.00	2.47	2.00
Powers, Gibbs & Co.'s Carolina Golden Belt Ammoniated Guano for Tobacco.....	8.00	2.06	3.00
Powers, Gibbs & Co.'s Powers' Ammoniated Guano	8.00	2.06	3.00
Powers, Gibbs & Co.'s Powers' Ammoniated Guano	8.00	2.06	2.00
Powers, Gibbs & Co.'s Gibbs' Ammoniated Guano	8.00	2.06	2.00
Powers, Gibbs & Co.'s Gibbs' Ammoniated Guano	8.00	2.06	1.50
Powers, Gibbs & Co.'s Almont Soluble Am- moniated Guano	8.00	2.06	1.50
Powers, Gibbs & Co.'s Almont Soluble Am- moniated Guano	8.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Powers, Gibbs & Co.'s Cotton-seed Meal Solu- ble Ammoniated Guano.....	8.00	1.65	2.00
Powers, Gibbs & Co.'s Eagle Island Ammoni- ated	8.00	1.65	2.00
Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Chick's 16 Per Cent Acid Phosphate	16.00	....	....
Southern Chemical Co.'s Red Cross 14 Per Cent Acid Phosphate.....	14.00	....	....
Southern Chemical Co.'s Victor Acid Phos- phate	13.00	....	....
Southern Chemical Co.'s Chatham Acid Phos- phate	13.00	....	....
Southern Chemical Co.'s Reaper Grain Appli- cation	12.00	....	3.00
Southern Chemical Co.'s Tar Heel Acid Phos- phate	12.00	....	....
Southern Chemical Co.'s Horseshoe Acid Phos- phate	12.00	....	....
Southern Chemical Co.'s Quickstep Bone and Potash	11.00	....	5.00
Southern Chemical Co.'s Solid South.....	10.00	....	6.00
Southern Chemical Co.'s Winner Grain Mix- ture	10.00	....	4.00
Southern Chemical Co.'s Farmers' Pride Bone and Potash	10.00	....	3.00
Southern Chemical Co.'s Winston Bone and Potash Compound	10.00	....	2.00
Southern Chemical Co.'s Mammoth Corn Grower	10.00	....	2.00
Southern Chemical Co.'s Mammoth Wheat and Grass Grower	10.00	....	2.00
Southern Chemical Co.'s Sun Brand Guano..	9.00	2.06	5.00
Southern Chemical Co.'s George Washington Plant Bed Fertilizer for Tobacco.....	8.00	2.47	2.50
Southern Chemical Co.'s Pilot Ammoniated Guano Special for Tobacco.....	8.00	2.06	3.00
Southern Chemical Co.'s Electric Tobacco Guano	8.00	1.65	2.00
Southern Chemical Co.'s Electric Standard Guano	8.00	1.65	2.00
Southern Chemical Co.'s Yadkin Complete Fer- tilizer	8.00	1.65	2.00
Southern Chemical Co.'s Chick's Special Wheat Compound	8.00	....	4.00
J. G. Tinsley & Co.'s Powhatan Acid Phos- phate	14.00	....	....
J. G. Tinsley & Co.'s Tinsley's Dissolved S. C. Bone	13.00	....	....
J. G. Tinsley & Co.'s Stonewall Brand Acid Phosphate	12.00	....	....
J. G. Tinsley & Co.'s Tinsley's Bone and Pot- ash Mixture	10.00	....	2.00
J. G. Tinsley & Co.'s Tinsley's Tobacco Fer- tilizer	8.00	3.29	2.50
J. G. Tinsley & Co.'s Richmond Brand Guano.	8.00	2.47	3.00
J. G. Tinsley & Co.'s Peanut Grower.....	8.00	1.00	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
J. G. Tinsley & Co.'s Killiekinick Tobacco Mix- ture	8.00	2.06	3.00
J. G. Tinsley & Co.'s Lee Brand Guano.....	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Brand Guano.	8.00	1.65	2.00
J. G. Tinsley & Co.'s Stonewall Tobacco Guano	8.00	1.65	2.00
J. G. Tinsley & Co.'s Tinsley's Special Irish Potato Guano	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's 7 Per Cent Am- moniated Guano for Beans, Peas, Cabbage, Strawberries	6.00	5.76	6.00
J. G. Tinsley & Co.'s Tinsley's Irish Potato Guano	6.00	4.94	6.00
J. G. Tinsley & Co.'s Tinsley's Strawberry Grower	6.00	3.29	4.00
J. G. Tinsley & Co.'s Tinsley's Top Dresser..	5.00	9.06	....
J. G. Tinsley & Co.'s Tinsley's 10 Per Cent Truck Guano	5.00	8.25	2.50
S. W. Travers & Co.'s Champion Acid Phos- phate	16.00	....	....
S. W. Travers & Co.'s Travers' Dissolved Acid Phosphate	14.00	....	....
S. W. Travers & Co.'s Standard Dissolved S. C. Bone	13.00	....	....
S. W. Travers & Co.'s Capital Dissolved Bone.	12.00	....	....
S. W. Travers & Co.'s Capital Bone and Pot- ash Compound	10.00	....	2.00
S. W. Travers & Co.'s Capital Truck Fer- tilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Capital Tobacco Fer- tilizer	8.00	3.29	3.00
S. W. Travers & Co.'s Big Leaf Tobacco Grower	8.00	2.47	3.00
S. W. Travers & Co.'s Capital Cotton Fer- tilizer	8.00	2.06	2.00
S. W. Travers & Co.'s National Fertilizer....	8.00	1.65	2.00
S. W. Travers & Co.'s National Special To- bacco Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Beef, Blood and Bone Fertilizer	8.00	1.65	2.00
S. W. Travers & Co.'s Peanut Grower.....	8.00	1.00	4.00
S. W. Travers & Co.'s Travers' Special Wheat Compound	8.00	....	4.00
S. W. Travers & Co.'s Travers' 7 Per Cent Truck Fertilizer	6.00	5.76	5.00
Virginia State Fertilizer Co.'s Bull Run Acid Phosphate	16.00	....	....
Virginia State Fertilizer Co.'s Gilt Edge Brand Acid Phosphate	14.00	....	....
Virginia State Fertilizer Co.'s Clipper Brand Acid Phosphate	13.00	....	....
Virginia State Fertilizer Co.'s Lurich Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Alps Brand Acid Phosphate	12.00	....	....
Virginia State Fertilizer Co.'s Mountain Top Bone and Potash.....	10.00	....	5.00
Virginia State Fertilizer Co.'s XX Potash Mix- ture	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Virginia State Fertilizer Co.'s Virginia State Dissolved Bone and Potash.....	10.00	....	2.00
Virginia State Fertilizer Co.'s Number One Soluble Guano	9.00	1.65	2.00
Virginia State Fertilizer Co.'s Highland King.	9.00	1.65	1.00
Virginia State Fertilizer Co.'s Gamecock Spe- cial for Tobacco	8.50	1.65	2.00
Virginia State Fertilizer Co.'s Virginia State High Grade Tobacco Guano.....	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Bull Dog Solu- ble Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Dunnington's Special Formula for Tobacco.....	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Peerless To- bacco Guano	8.00	2.47	3.00
Virginia State Fertilizer Co.'s Buffalo Guano.	8.00	2.06	3.00
Virginia State Fertilizer Co.'s Austrian To- bacco Grower	8.00	2.06	2.00
Virginia State Fertilizer Co.'s Gilt Edge Spe- cial Tobacco Guano.....	8.00	2.06	2.00
Virginia State Fertilizer Co.'s Virginia State Guano	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Battle Axe To- bacco Guano	8.00	1.65	2.00
Virginia State Fertilizer Co.'s Gilt Edge Brand Dissolved Bone and Potash.....	8.00	....	4.00
<i>Thomas Wakefield, Friendship, N. C.—</i>			
Pure Raw Bone Meal.....Total	21.73	4.10	....
<i>Williams & Clark Fertilizer Co., Charleston, S. C.—</i>			
Standard Americus Ammoniated Bone Super- phosphate	9.00	1.85	1.00
<i>Winborne-Brown Guano Co., Norfolk, Va.—</i>			
High Grade Acid Phosphate.....	16.00	....	....
Standard Acid Phosphate.....	14.00	....	....
Soluble Bone and Potash.....	10.00	....	2.00
Big Triumph Guano.....	8.00	3.30	4.00
Farmers Select Guano.....	8.00	2.47	4.00
King Taminy Guano.....	8.00	2.47	3.00
Winborne's Tobacco Guano.....	8.00	2.47	3.00
Champion Crop Grower.....	8.00	1.65	2.00
Winborne's Excelsior Guano.....	8.00	1.65	2.00
Standard Eureka Guano.....	8.00	1.65	2.00
Climax Peanut Guano.....	8.00	.82	4.00
High Grade Top Dresser.....	7.00	7.82	3.00
Premium Top Dresser.....	6.00	7.40	3.00
Big Crop 7 Per Cent Guano.....	5.00	5.75	5.00
Nitrate of Soda.....	....	15.65	....
Muriate of Potash.....	....	....	50.00
Genuine German Kainit.....	....	....	12.00
<i>T. W. Wood & Sons, Richmond, Va.—</i>			
Wood's Pure Animal Bone.....Total	23.00	2.47	....
Standard H. G. Acid Phosphate.....	16.00	....	....
Standard High Grade Acid Phosphate.....	14.00	....	....
Wood's Corn Fertilizer.....	10.00	.82	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Bone and Potash Mixture.....	10.00	.....	2.00
Standard Corn Fertilizer.....	9.00	1.23	1.00
Standard Wheat Fertilizer.....	9.00	1.23	1.00
Standard High Grade Truckee Fertilizer.....	8.00	4.93	6.00
Standard Vegetable Fertilizer.....	8.00	2.47	3.00
Standard Potato Fertilizer.....	8.00	1.65	5.00
Standard Grain and Grass Fertilizer.....	8.00	1.65	2.00
Standard Crop Grower Fertilizer.....	8.00	1.63	2.00
Wood's Lawn Enricher.....	6.00	2.47	3.00
Nitrate of Soda.....	.....	15.63	.....
Muriate of Potash.....	.....	.....	50.00
Sulphate of Potash.....	.....	.....	48.00
Kainit.....	.....	.....	12.00
<i>Wessell, Dural & Co., New York, N. Y.</i>			
Nitrate of Soda.....	.....	14.85	.....
<i>S. L. Warren, Calypso, N. C.—</i>			
Acid.....	16.00	.....	.....
<i>Wilson Chemical Co., Wilson, N. C.—</i>			
16 Per Cent Acid Phosphate.....	16.00	.....	.....
14 Per Cent Acid Phosphate.....	14.00	.....	.....
East Carolina Tobacco Grower.....	8.00	2.47	3.00
Brag Cotton Grower.....	8.00	2.05	3.00
McGee's Potato Special.....	6.00	3.30	8.00
<i>The J. R. Young Fertilizer Co., Norfolk, Va.—</i>			
High Grade 16 Per Cent Acid Phosphate.....	16.00	.....	.....
Special Bone and Potash Compound.....	10.00	.....	11.00
J. R. Young's Bone Mixture.....	10.00	.....	4.00
Young's Bone and Potash Guano.....	10.00	.....	2.00
Bone and Potash Mixture.....	10.00	.....	2.00
J. R. Young's 2½-9-2 Special Guano.....	9.00	2.26	2.00
J. R. Young's 4-8-4 Crop Grower.....	8.00	3.29	4.00
J. R. Young's New Process 3-8-3 Guano for Tobacco.....	8.00	2.47	3.00
J. R. Young's New Process 2-8-2 Guano for Cotton, Corn and Peanuts.....	8.00	1.65	2.00
J. R. Young's Special Top Dresser.....	7.00	6.76	3.00
Pasquotank 5-6-7 Potato Grower.....	6.00	4.11	7.00
J. R. Young's Special Guano for Potatoes...	6.00	4.11	5.00
J. R. Young's Improved Fish and Bone Manure for All Crops.....	6.00	3.29	4.00
J. R. Young's New Process Grower.....	5.00	5.76	3.50
J. R. Young's 3-6-6 Special Guano for S. P....	6.00	2.47	6.00
J. R. Young's 4-4-6 Special for Tobacco.....	4.00	3.29	6.00
Nitrate of Soda.....	.....	14.85	.....
J. R. Young's German Kainit.....	.....	.....	12.00
Genuine German Kainit.....	.....	.....	12.00



LEAF TOBACCO SALES FOR JUNE, 1911.

Pounds sold for producers, first hand.....	243,896
Pounds sold for dealers.....	21,389
Pounds resold for warehouses.....	21,022
Total.....	286,307



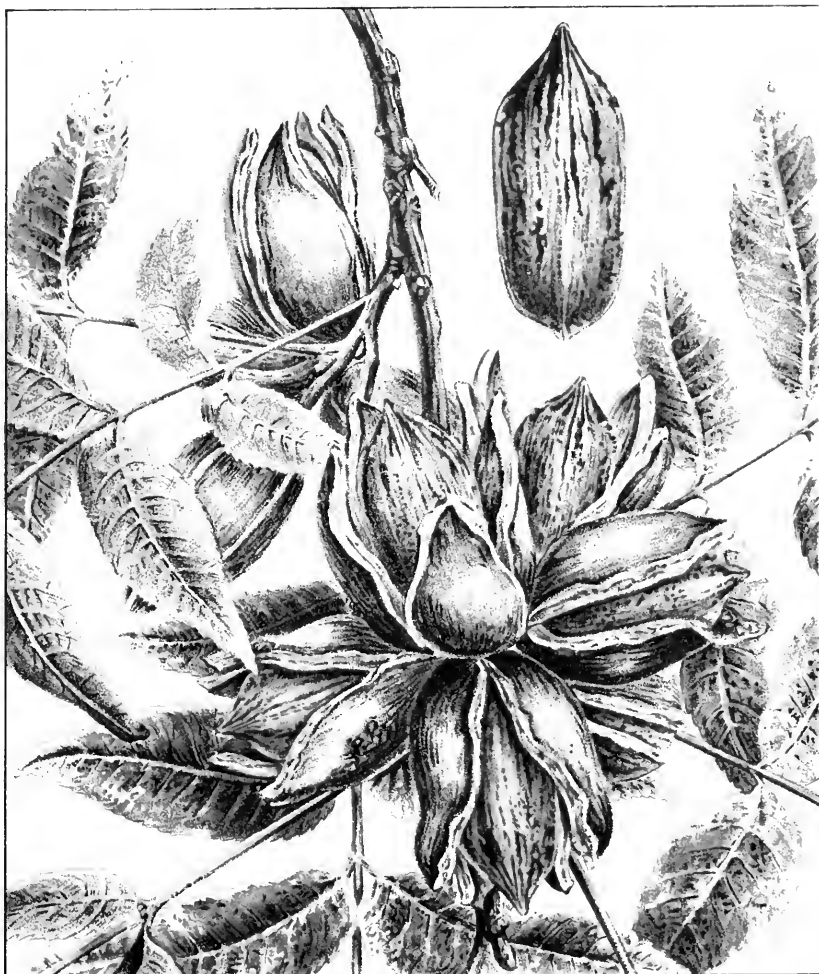
THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE,
RALEIGH.

Vol. 32, No. 9.

SEPTEMBER, 1911.

Whole No. 156.

PECANS.
SECOND BULLETIN BY W. N. HUTT.



ECKERT LITHO CO. WASH. D.C.

A CLUSTER OF SCHLEY PECANS.

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, N. C., September 6, 1911.

SIR:—I submit herewith my second report on the behavior of pecan trees throughout the State of North Carolina, and especially the results obtained on the experimental orchards of the State Test Farms. I recommend that this report be published as the September BULLETIN.

Very respectfully,

W. N. HUTT.

State Horticulturist.

To HON. W. A. GRAHAM,

Commissioner of Agriculture.

PECANS.

SECOND BULLETIN.

By W. N. HUTT.

Just two years ago I wrote my first bulletin on the growing of pecans in North Carolina. At that time I did not expect to have anything further to report on this subject for several years. The old idea that a pecan tree requires a decade or two to come into bearing was generally believed to be true, because there was no experimental data to the contrary.

When I planted the experimental pecan orchards on three of the State Test Farms in the winter of 1906-7, I had, in accordance with the prevailing opinion, made up my mind that for the present I had done all I could, and having years to wait before I could expect sufficient data for publication, I would, in the meantime, turn my attention to quicker-maturing lines of experimental work. But those pecan trees did not stand idle nor make the tardy growth that tradition said they would. Under intensive cultivation they grew by leaps and bounds, and the largest trees just three years from setting produced a few scattering nuts. The varieties that bore the first nuts were Schley, Stuart, and Curtis. The fourth season there was an increased number of nuts on the trees that bore last year, and new trees came into bearing. The additional varieties that came into bearing the fourth season were Frotsher, Georgia, Louisiana, and Dewey. Surely, this was "getting busy" early, and also flatly contradicting the old idea that the pecan is normally very late in bearing. Valuable experimental data of many kinds accumulated rapidly; and that is why this second pecan bulletin follows so rapidly on the heels of the first.

In the spring, careful observations were made on the budding-out of the trees. It was found that there was great variation in the time of starting of growth in different varieties, and even in trees of the same variety. Peach trees had been set as "fillers" between the pecan trees. When the peach trees were all in leaf not a single pecan tree had started. Growth of all kinds was in full swing when the first pecan trees began tardily to push out. Seedling pecan trees nearby were in full leaf. Although the season was a very favorable one for growth, there being a great deal of rain in spring and early summer, many of the pecan trees did not bud out until midsummer. Several of the trees started growth in early autumn, while a few showed no sign at all of growth the first season, and did not push a

single bud the whole year through. On cutting into these latter trees, it was found that the bark was still fresh and green and the wood living. They remained dormant a whole year, and some of them budded out the following spring. I have seen trees of other kinds that were tardy to bud out after transplanting, but in all my horticultural experience I have never seen anything to equal the tardiness and irregularity in budding of transplanted pecan trees. This peculiarity was so marked, and in such striking contrast to other trees, that from that time on careful records were kept of the time of budding-out of the pecan trees in the spring and their maturing of buds and terminals in the fall. As was to be expected, there was less variation in the time of beginning growth the following season, for most of the trees had become established and were ready to put out as soon as weather conditions were favorable.

The following tabulated report gives a record of the behavior of the twenty-seven varieties under test during the season of 1910, which was a normal season:

RECORD OF PECAN GROWTH AND MATURITY—SEASON 1910.

VARIETIES.	Record of Budding-out March 22, 1910.	Record of New Growth April 6, 1910.	Record of Maturity, Taken November 28, 1910, After Killing Frost November 1.	Record of Winter Condition of Twigs and Terminals, Taken December 12, 1910.
Appomattox...	Dormant.....		All leaves shed.....	Firm and mature.
Mantura.....	Dormant.....		All leaves shed.....	Firm and mature.
Stuart.....	Dormant.....	1½ in. long..	All leaves shed.....	Firm and mature.
Rome.....	Dormant.....	2 in. long..	All leaves shed.....	Firm and mature.
Money-maker..	Dormant.....	3 in. long..	All leaves shed.....	Firm and mature.
Clark.....	Dormant.....	3 in. long..	All leaves shed.....	Firm and mature.
Curtis.....	Dormant.....	4 in. long..	All leaves shed.....	Mature.
Centennial....	Dormant.....	4 in. long..	All leaves shed.....	Firm and mature.
Dewey.....	Dormant.....	3 in. long..	All leaves shed.....	Firm and mature.
Van Deman....	Dormant.....	2½ in. long..	All leaves shed.....	Firm and mature.
Teche.....	Dormant.....			Soft and not mature.
Capital.....	Dormant.....			
Frotscher.....	Buds swelling...	2 in. long..	A few leaves still hanging on.	Firm.
Sweetmeat....	Buds swelling...	3 in. long..	A few leaves still hanging on.	Soft and not mature.
Louisiana.....	Buds swelling...	4 in. long..	All leaves shed.....	Soft.
Atlanta.....	Buds swelling...	4 in. long..	All leaves shed.....	Mature.
Dalzell.....	Buds swelling...	3 in. long..	All leaves shed.....	Soft.
Monarch.....	Buds swelling...	2 in. long..		Soft.
Schley.....	Buds swelling...	4 in. long..	A few leaves still hanging on.	Somewhat soft.
Russell.....	Buds bursting...	3 in. long..	75% of leaves hang- ing dead on trees.	Soft and immature, trees winter-killed later.

RECORD OF PECAN GROWTH AND MATURITY—SEASON 1910—*Continued.*

VARIETIES.	Record of Budding-out March 22, 1910.	Record of New Growth April 6, 1910.	Record of Maturity, Taken November 28, 1910, After Killing Frost November 1.	Record of Winter Condition of Twigs and Terminals, Taken December 12, 1910.
Alley.....	Buds bursting...	5 in. long...	A few leaves hanging on.	Soft and immature.
Magnum.....	Buds bursting...	1 in. long...	A few leaves hanging on.	Soft and immature.
Randall.....	Buds bursting...	7 in. long...	Many dead leaves hanging on.	Soft and immature.
Senator.....	Buds bursting...	5 in. long.....	.....	.....
Robson.....	Buds opening right out.	6 in. long...	Many dead leaves hanging on.	Very soft and imma- ture.
Georgia.....	Buds opening right out.	6 in. long...	Many dead leaves hanging on.	Very soft and imma- ture.

San Saba—Very tender here. All trees died.

HARDY VARIETIES.

In the preceding tabulated report it has been the effort to classify the varieties as nearly as possible into groups having about the same degree of hardiness. Since nearly all of the named varieties of pecans have originated in the most southerly States, it is evident that for North Carolina and northward varieties must be selected with an idea to hardiness. To do this, we must select varieties that will remain dormant until after danger of late spring frosts, but after starting will grow rapidly and mature buds and terminals within our growing season. Many southern varieties of pecans start into growth with us before it is safe for them to do so, and get their early growth and fruit buds killed by late frosts. Many, it will be seen from the table, require a longer growing season than ours and do not mature their buds and terminals sufficiently to get safely through our winter season. The varieties wanted for northern planting are, in short, those that start late, grow fast, and ripen early. Although thousands of seedling pecans are growing in North Carolina, there is not a single one that I know of that has been or is at present being propagated. Many of our seedling nuts are well filled and of good flavor, but are too small in size to be propagated, when we have better varieties that can be grown successfully in our State. There is no doubt that sooner or later a native North Carolina variety of pecan will be found that will be a distinct addition to existing variety lists and that will be especially suited for growing in this State.

In Virginia two large, thin-shell varieties have been found and are now being propagated and disseminated. These are the Mantura, which originated in Surry County, and the Appomattox, which originated at Petersburg. These hardy varieties are of great advantage because they extend the area of pecan growing much north of where it was supposed the pecan would succeed.

In our variety collection we have had these pecans under test for only two years, and therefore have not fruited them. They have.



FIG. 1. A bearing pecan orchard.
(Photo by M. C. A. Reed, Department of Agriculture, Washington, D. C.)

however, proved themselves hardy, vigorous growers, and seem to be well suited for growing in this State. On account of their hardiness, they are worthy of trial in the piedmont region and even in the mountains.

VARIETIES OF PECANS FOR PIEDMONT.

Until recently it was considered that the pecan was especially a lowland tree that could not be grown successfully above 500 feet altitude. From our experiments at Statesville, N. C., at an altitude of 1,000 feet, we find that a few varieties, notably Stuart, Mantura, and Appomattox, grow very well. At High Point, N. C., at an altitude of 950 feet, there is a seedling orchard many trees of which have borne fine crops of nuts.

THE PECAN AREA MOVING NORTHWARD.

In regard to hardiness, the history of the pecan tree is very closely paralleling that of the corn plant. In the early days of corn growing, corn was considered a southern plant that could not be grown successfully in the North and West. Corn breeders set to work to produce a quick-growing, early-maturing, and therefore hardy variety of corn. This end was attained and a variety produced that could make its entire growth and ripen its grain in ninety days from the planting of the seed. This "Ninety-day Corn," as the variety was called, produced a revolution in the corn-growing world. Corn growing went north by leaps and bounds. Earlier and quicker-maturing varieties were produced, until corn is now grown successfully away north in Canada.

It now looks as if the history of pecan growing will be analogous to that of corn production. Scarcely a decade ago it was believed that pecans could not be grown commercially anywhere out of the Gulf States; but through adapted varieties the march of successful pecan production has been steadily northward. In South Carolina many orchards have been planted and are now coming into bearing. In that State have been set a few of the largest orchards anywhere in the country. At Charleston there is an orchard of 16,000 pecan trees from which the owner sells several car-loads of nuts annually.

In North Carolina we have not been idle in this matter. All over the eastern part of the State thousands of seedling trees have been successfully fruited. Orchards of budded trees have naturally followed. Ten commercial pecan orchards of named varieties have been set in this State in the last four years. Several large orchards are to be set this coming winter, and more will follow next season.

By the use of hardy varieties Virginia has also been coming into the field of pecan production. Many seedling trees have been planted and a few orchards set of budded varieties.

A great deal of interest is being taken in pecan planting in Mary-



FIG. 2. A Mantura pecan tree during its first summer.

land, where the progress has been very much encouraged by the writings and experiments of Professor Close, Horticulturist of the State Experiment Station. Even as far north as Pennsylvania, seedling pecan trees have been found growing and producing matured nuts. The western range of pecan growing has also been steadily advancing. The pecan is found native along the Mississippi and its tributaries as far north as Davenport, Iowa; Terre Haute, Indiana, and Cincinnati, Ohio. The northwestern area in which it is indigenous embraces portions of Iowa, Illinois, Indiana, Ohio, Missouri, and Kentucky. From the native areas of the pecan in these States nuts have been carried and trees planted in yards, gardens, and fields over a very wide range of country. Trifling as such plantings may seem individually, they amount in the aggregate to thousands of trees. Kentucky and Indiana have recently made distinct advance in pecan growing in originating named varieties that have a short, quick-growing season, and that ripen their terminals before winter. These varieties start into growth late in spring, go dormant early in the fall, and thus are able to withstand extreme cold. These far northern varieties are being propagated for planting in the colder regions of the pecan area, and will doubtless extend the area of pecan culture much north and west of its present range.

In taking notes on the growth of the trees in our three experimental orchards, the first year after transplanting, it was found that those trees that started earliest made in every case the most satisfactory growth; not a single tree that pushed out promptly but made good, clean, thrifty branches. The trees that started about midseason made short tufted shoots with many small leaves, but did not mature any satisfactory permanent branches. The last trees to start out made short, weak sprouts, with tufts of yellowish leaves. The trees that did not start at all the first season generally died the second season, as did also many of the ones that started last. Most of those that started in midseason got into vigorous growth the second year, but they were never able to catch up in growth with those that got the early start.

PECANS DO BEST ON WELL-DRAINED SOILS.

In going over the season's growth on the three different test orchards it was found that the best stand of trees and greatest amount of growth had been made on the best drained soils. Contrary as it may seem to prevailing opinion, I am firmly convinced from our experiments and from my observations throughout the whole area of pecan culture, that pecan trees cannot be grown successfully on wet, crawfishy, ill-drained land. It is often quoted that the pecan grows native along the river bottoms of the Mississippi and its tributaries, and that this land is frequently under overflow for weeks, sometimes even for months. If, however, the observer will note these same over-



FIG. 3. A MoneyMaker pecan during its third growing season.

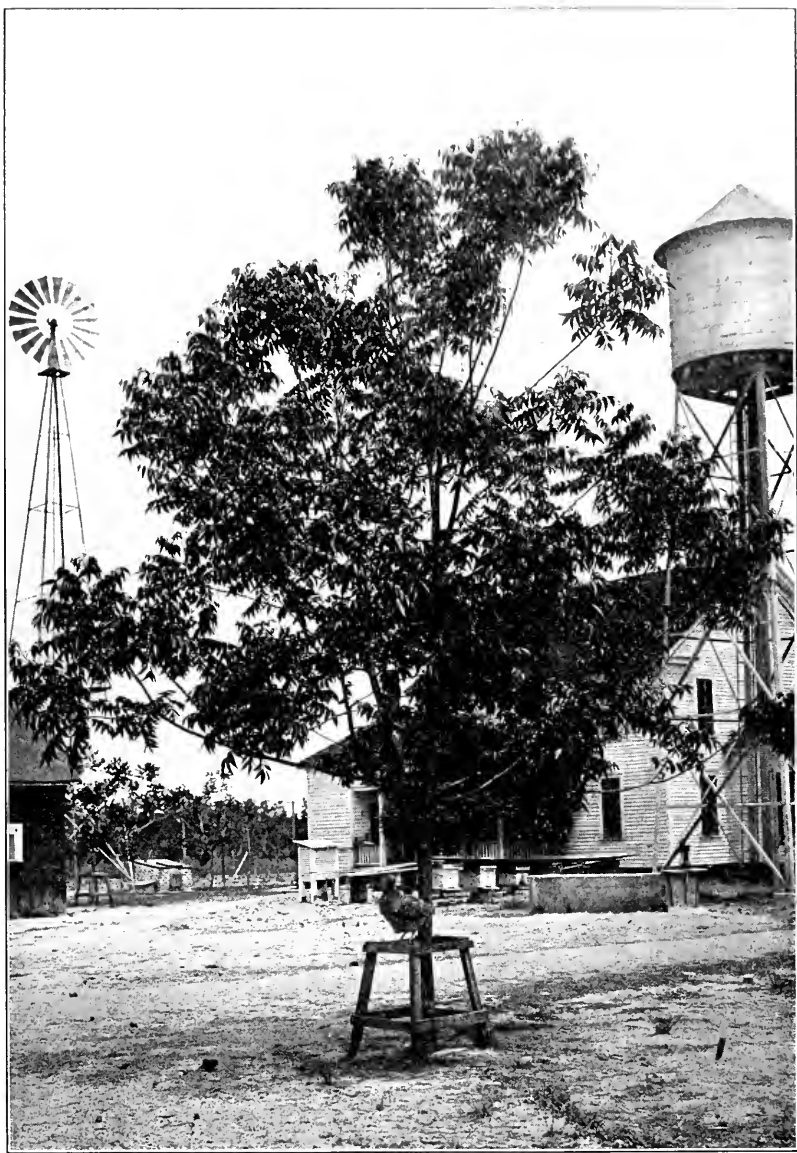


FIG. 4. A four-year-old Schley tree at Willard, N. C., bearing its second crop of nuts.
(Photo by S. B. Shaw.)

flow lands during the growing season he will find that they are high above water level and ideal for the growth of any crop. Indeed, these same overflow lands will produce the finest corn and cotton and would be under these crops year after year were it not that the river sometimes rises in its might and gathers in the crop while the planter looks on in helplessness to see the results of his labors going down the bosom of the turbid stream, not loaded in barges going to a profitable market, but tangled in the swirling eddies and swept down to enrich banks and bottoms nearer the Gulf. But the same raging overflow that brings death and destruction to the annual crops caught in its wake brings life and vigor to the pecan trees, for they have inured themselves through generations of experience to resisting the surges with their strong trunks and tough elastic branches, and then after the flood has passed they feast and grow strong on the rich alluvium it has brought to them. The pecan tree is fitted by nature to resist the floods and high water, but it cannot resist the still, stagnant seep of a marshy soil. One never sees the pecan tree growing and thriving where the willow and gum hold their water-bound habitat. Many people make the mistake of thinking that their sour, boggy land which will grow no useful crop can be made into a profitable pecan orchard.

PREPARING THE LAND FOR PLANTING PECANS.

The pecan, like any other orchard tree, makes its best growth when planted on thoroughly-prepared land. This has been well shown in our different Test Farm orchards. Our most satisfactory and uniform orchard is growing on the Test Farm in Edgecombe County, N. C., because there the soil was uniform and in a high state of fertility from leguminous crops before the trees were set. This soil is a rich Norfolk sandy loam and is perfectly drained, except on one corner, where there is a dip towards a creek. The pecan is commonly considered to be a water-loving tree, but it is strange to say that it was only on this wet portion of the orchard that we lost any trees. Trees planted a second time on this wet land failed. It was then very evident that the wetness and sourness of the soil and subsoil was the cause of the trees dying on this portion of the planting. The creek was therefore cleaned and deepened and a line of tile put through the wet part, and now pecan trees are living on this ground.

The orchard on the Pender County Test Farm, 33 miles north of Wilmington, N. C., was set on newly cleared land, and though individual trees have made very handsome growths, the whole orchard is nothing like as uniform as the orchard on the well-tilled farm land on the Edgecombe Test Farm. The Pender County land is Portsmouth sandy loam. When the land was cleared on this farm the pecan trees were set as the first crop, and peach trees were, as in



FIG. 5. A four-year-old Curtis tree at Willard, N. C., bearing its second crop of nuts.

the other orchards, put in as "fillers." The land is inclined to be sour. It is rather level, there being but 2 feet difference in elevation on different parts of it. This slight variation in elevation seems to have accounted in a remarkable manner for the irregularity of the trees. Where the land was highest and driest there, in every case, was the best growth of pecan trees. On the lowest parts, which were found to be quite sour, every one of the pecan trees died, as did also the peach trees. The cover crop of cowpeas between the trees also did badly. This was undoubtedly sour land, as evidenced by all the crops which were placed on it. The pecan trees, although supposedly semi-aquatics, were not a whit more resistant to these conditions, but died out like the peach trees and annual crops. These sour spots were limed, deeply plowed, and were thoroughly cleared the second winter and again set to pecan trees. In spite of the lime and additional tillage, most of the reset trees perished the second season. This was still more convincing evidence that pecan trees are not at home on wet, sour soils. As the pecan trees on the higher and drier portions of the orchard had made a very fine growth, it was decided to thoroughly underdrain all the lower, sour parts, so as to get the whole tract of land into a solid block of pecan trees. The ground was surveyed by an engineer and a complete system of tile drains put in on the sour parts with laterals 40 feet apart. This system began at once to correct the unfavorable drainage conditions. New pecan trees were planted and are now growing satisfactorily on the same land where previously every tree had died. All my experiments and observations go to show that the pecan tree requires well-drained land. I doubt very much if pecan trees can be made to grow successfully on any land that will not produce good cotton or corn. On the other hand, I think it can be safely said that land that will produce corn and cotton will grow pecans.

The pecan tree is not now a wild, uncivilized tree, as some people seem to think, that can "rough it" in the wild, but a domesticated plant that uses and needs the same kind of plant food as that on which other domesticated and cultivated crops thrive and produce. It is true that the pecan tree is found in its native forests as a wild tree, fighting its battle for light and air with the other wild trees of the forest. It is not, however, under such conditions that it produces its bounteous crops of delicious nuts. It is only when given space and food as an orchard tree that it finds its hard struggle for existence over and that it is able to give a return for such protection. The *Rotundifolia* grape is well known to be one of the heaviest fruit producers in the whole range of horticultural plants. The woods in the southern coastal section of Eastern United States from Virginia to Texas are just a tangle of these vines; yet how seldom one sees fruit

on them. But take one of these vines from the woods and allow it to run at will over a trellis in the open, and it will return thanks to you with bushels of its luscious fruits. None of nature's children, the pecan tree included, is ungrateful for care bestowed upon it.

PECAN TREES IN COTTON FIELDS.

In my experience, one of the best places for planting a pecan orchard is in a cotton field. Pecan trees are very deep-rooted, feed far below the surface, and do not encroach much on the cotton land until they are big enough to give a profit for its use. Pecan trees should not be set less than 50 feet apart; 60 feet is better. In these wide middles cotton and other crops can be successfully cultivated for years until the trees require all the land. In this way a planter need not be out of the use of his land, but can at the same time be gradually changing an annual crop that adds no permanent increment to the value of his soil to a perennial one that makes his land more valuable every year it grows upon it. Of course, I would not advise cotton planters to put all their lands in pecan trees, but I do believe that every cotton plantation would be enhanced in value if it had on it a larger or smaller pecan orchard, if only of a few trees. A special advantage of the cotton field for pecan planting is that the trees are practically assured of cultivation. I have never seen a pecan orchard that was a success unless it was cultivated, at least while the trees were young. It is for this reason that I prefer the term "pecan orchard" to "pecan grove," for the latter term has about it more of the idea of a green unbroken turf, and, from my experience, I am very sure that this is not the condition conducive to large yields of nuts. Professor Van Deman says "Nature plants groves, but man plants orchards."

Where maintenance crops are grown in a pecan orchard, judgment should be exercised in not allowing the rows to encroach too closely on the trees, thus robbing them of plant food and moisture. If this is done, valuable time will be lost in getting the trees into bearing. Maintenance or cover crops should not be allowed to grow nearer than 6 feet to the tree row, and of course no crop of any kind should be planted in the tree row itself.

A good farmer who recently, at my solicitation, set out a pecan orchard asked me one day to look at his trees, because they did not seem to be doing well. When I drove with him to his place I had difficulty in finding his orchard, for the place on which he had planted it was now a solid field of tall, waving corn, which looked as if it would produce 100 bushels to the acre. I could not at first see a single pecan tree, but after locating the corn row in which the trees were set I was able to find a number of dead ones and some very



FIG. 6. A five-year-old pecan tree.
(Photo by Mr. C. A. Reed, Department of Agriculture, Washington, D. C.)

small, living but discouraged-looking trees. They would have had more chance of survival in the struggle in their native forest than in that jungle of corn. The field was planted solid with corn, there being just one hill left out where the pecan tree stood. The trees were cultivated, and intensely so, but what chance had they of surviving, much less of making a satisfactory growth! I believe that when Euclid, the mathematician of antiquity, said, "It is impossible to have two things in the same space at the same time," he was thinking especially of a corn crop in a pecan orchard. Corn is too tall a plant and too gross a feeder to be used successfully as a cover crop in any kind of an orchard, unless it is kept at a reasonable distance from the trees.

Besides giving the young pecan trees reasonable protection from the encroachment of crops, they should be protected from their worst of all enemies, "the nigger and the mule." It makes no difference how vigorously a tree grows, if it is run over periodically with a plow and barked by trace-chains and singletrees, it never gets to bearing age. This enemy usually can be kept at bay by driving in three or four stout stakes and nailing them solid at the top with slats so as to securely enclose the tree. Fig. 2 shows such a tree protector.

CARE OF PECAN TREES.

Pecan trees respond quickly to intensive tillage. From my experimental work and horticultural experience, I am firmly convinced that it is quite unnecessary to wait indefinitely with one's capital tied up in an orchard to get it into profitable bearing. The man who waits indefinitely is the man who starves his trees. The habits of growth and time of bearing of most of our standard varieties of trees are pretty definitely known. If pecan trees get what they require to make their proper growth, they will come into bearing on schedule time. If, however, they are starved and stunted when they should be making their most rapid growth, they seldom come into profitable bearing.

To get pecan trees into early production they should be kept growing vigorously from the time they are planted. To insure this end they should be cultivated after each rain like other crops. If the ground is not naturally rich, as an overflow land, the trees should be helped with manure and commercial fertilizer.

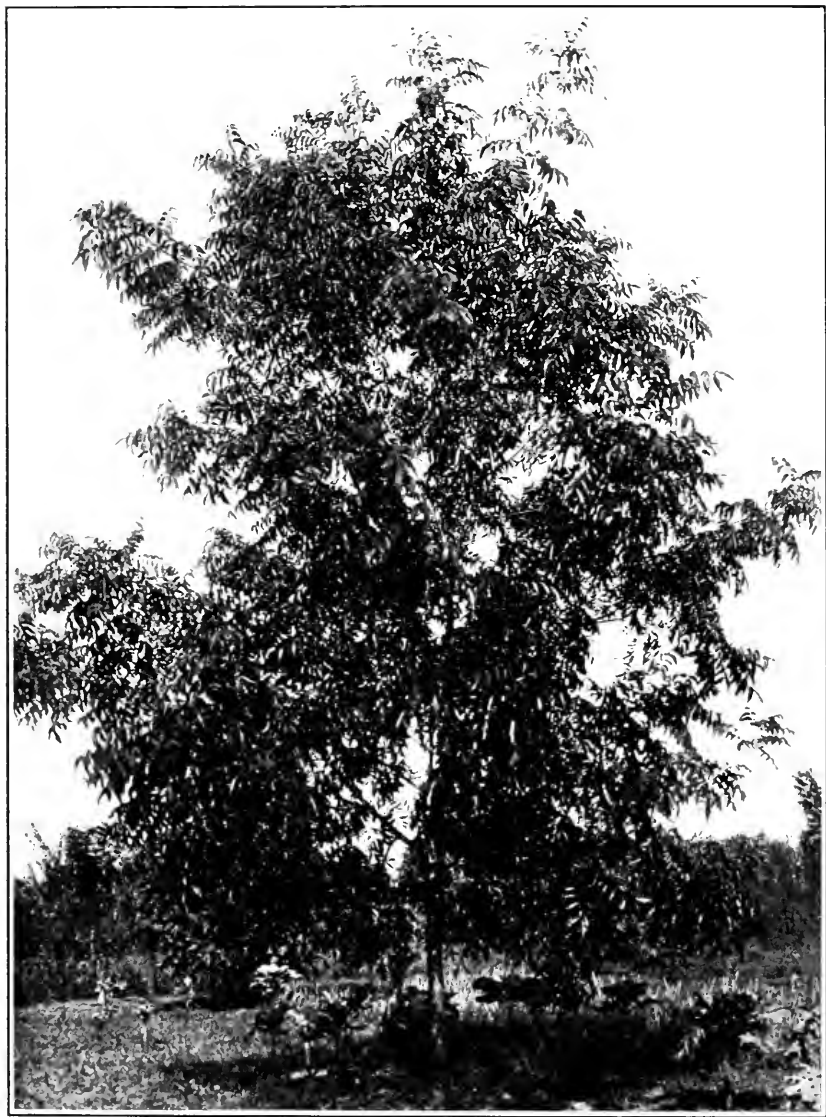


FIG. 7. A six-year-old pecan tree.
(Photo by Mr. C. A. Reed, Department of Agriculture, Washington, D. C.)

FERTILIZERS FOR PECAN TREES.

For growing pecan trees I have found the following fertilizers to give very good results:

Phosphoric acid.....	8%	} 2 to 10 pounds per tree.
Nitrogen	5%	
Potash	3%	

For the nitrogenous part of the fertilizer, blood, tankage, cotton-seed meal, or some slow form of ammonia should be used. Nitrate of soda is too quick in its action for pecan trees. The fertilizer should all be put on early in the season in one application and worked in with the early cultivation. Late applications, especially of nitrogenous fertilizers, keep the wood growing too late and hinder the ripening of the terminals. We had experimental evidence of this last season with a tree of the variety, Alley. This was set in a highly manured rose bed. It grew very rank right up to the time of killing frost, while the other trees of the same variety prepared for winter. In the winter this one tree had all its branches badly killed back, while the other trees, though somewhat soft, came through in fairly good condition.

OVERFLOW LANDS FOR PECAN PLANTING.

As an attractive horticultural investment, I know of nothing more promising than the planting of pecan orchards on the rich overflow lands in Eastern Carolina lying along the Cape Fear, Neuse, Tar, and Roanoke rivers. These lands have for centuries been enriched by deposits of alluvial soil brought down by the rivers in times of overflow. These deposits have stratified year after year until they have built up in these places some of the richest soil deposits to be found anywhere in the country. Many of these lands are cleared and produce the most magnificent crops, but so many crops are lost by overflow that most of these lands are abandoned and are consequently of little value. If these lands be diked above the line of highest overflow, as has been done by the State on its penal farm at Tillery, N. C., they become of great value for farming purposes. The expense of such diking is so great, however, that it can scarcely be undertaken except by the State or National Government, or by large corporations. But while these extremely rich lands are, under the circumstances, useless for ordinary crops, they are ideal for pecan trees. In such soils the trees grow rapidly and there is no expense at all for irrigation or fertilizers, as these the river supplies, almost when necessary. The overflow is a benefit rather than otherwise to the pecan trees, for it supplies them with a new dressing of fertilizer. As pecan nuts ripen over a considerable period and many varieties

remain in the shuck mature some time before dropping out, an overflow coming at nut harvest would not destroy the crop, but only delay its gathering. As the pecan tree is by nature ideally suited to overflow lands and as these same lands, from the circumstances before mentioned, are purchasable at very low price, they offer very fine opportunities for the investment of capital. I have reason to believe that the overflow lands of Eastern Carolina will in the not too distant



FIG. 8. Setting a pecan tree by the use of a planting board.

future be one of the foremost pecan-growing sections of the country. It does not need a prophet to foretell that they will then be the most valuable agricultural lands in the State.

Overflow lands can be handled more cheaply in pecan trees than can cultivated lands, because they are so rich in humus that much less cultivation is required to conserve moisture. In most cases about all that is necessary is to keep the land clear about the young trees so that

they are not overtopped and choked out by the rank growth of weeds and underbrush. It is not even necessary to clear all the land right at the start, but strips can be cleared for the tree rows and the middles shrubbed out later. If the shrubbing is done in the fall of the year a great deal of rank growth can be killed out very cheaply. Most of the woody growths on overflow lands are killed and rotted out if the sprouts are kept down. All large, long-lasting stumps should be blown out with dynamite before the pecan trees get large. In this way rough overflow land can be cleared and gotten into shape while the little pecan trees are growing on the land.

CUT-OVER LANDS FOR PECANS.

There is a good deal of call for information as to how to handle cut-over timber lands in order to get them into profitable pecan orchards. The method employed will depend a good deal on the nature of the land, but in nearly all cases this will amount to a total or partial clearing of the ground before tree planting can profitably begin. Most of the cut-over lands are sour—so sour that they will not successfully grow farm crops for a year or two, and, as has been said, if farm crops cannot be grown it is throwing away money to try to grow pecan trees. The only thing to do is to clear up, lime, and break the land and sow it in corn or cowpeas or both. These are good crops for taming land. As soon as they can be grown successfully the pecan trees can safely be planted. Where land is sometimes reasonably free from trees, strips can be broken up and prepared as described before and the tree rows set before the whole land is plowed and brought into cultivation. The middles can be cleared later, thus saving or rather delaying the expense of clearing the whole land at once. However, where practicable it is better to break up the whole land, using the middles for suitable cover crops. In this way the land-taming process is hastened and the growth of the trees accelerated.

OLD VERSUS NEW LAND.

I would say to intending pecan planters, if it ever comes to a choice of location between poor, worn-out farm land and cut-over timber land, make every concession to the land that has been mellowed by the ploughshare before assuming the problems of an untamed heath. From the nature of our climate there is little or no virgin fertility in new land, and I have found from experience that it is always a severe strain on one's religion to clear land of fat-lightwood stumps. The fertility in our southern soils is not found there naturally, but is acquired from the fertilizer sack and the cowpea plant. On the other hand, our soils never wear out, but are as indestructible as the

elements. A crop or two of cowpeas and, in aggravated cases, an additional one of rye and vetch mixed with brains and a small amount of elbow grease, and southern soils can be made to produce almost any crop desired.

PECAN SOILS.

Since writing my last pecan bulletin, I have had no reason to modify what I said at that time regarding soils for pecans. There are only two kinds of soils in the south that I have found will not grow pecan trees. The first is one that is too wet, and the second one that has a hard pan. Both of these unfavorable conditions can be corrected, and when this is done the trees will grow all right. The correcting of wet, sour lands for pecan growing has already been discussed at length. As to the hard-pan condition, it is somewhat more difficult to overcome. If it cannot be broken up so that the tree roots can get deep down into the soil, that location had better be abandoned and some other place chosen for the pecan orchard.

The pecan has the most remarkable development of tap-root of all cultivated trees. The function of a tap-root seems to be to go deep into the soil. From my observations, pecan trees go deeper into the soil than any other cultivated trees. In the first year's growth of the seedling pecan tree it begins at the very outset the development of its enormous tap-root. This goes straight down into the soil three or four times as deep as the top rises above the surface. After transplanting, the tree begins with its first growth the formation of a new tap-root, and most often several of them. There must be something inherent in the life processes of the tree that so persistently fosters the development of tap-roots in pecans. This is undoubtedly the desire for moisture. Pecan roots normally go down very deeply into the soil after water. Mr. C. A. Reed, pecan specialist of the National Department of Agriculture, says that in the south well diggers regard the pecan tree as an indicator of where underground water is to be found. I have observed that pecan trees make their best development where there is nothing to check their downward growth. In farming and trucking, a soil is not considered of much value that has not a hard clay subsoil somewhere within 1 or 2 feet of the surface, because without it fertilizers seem to be leached out below and lost. Pecan trees grow to perfection on loose, bottomless soils that would be considered utterly worthless for farming and trucking purposes. Fertilizers and moisture never seem to get beyond their extensive root range. In the protracted drought of the season of 1911, while other trees were withering up and dying, pecan trees made their normal growth, apparently unaffected by the excessive dryness. Some of the finest pecan nuts that I have ever seen were produced on soil so light

and sandy that it appeared to be nothing but a blow-sand. The trees were small, but were early and heavy nut producers.

TRANSPLANTING PECAN TREES.

From the foregoing it is evident that pecan trees require a deep soil where their downward root growth is unimpeded by subsoil or hard pan. In planting pecan trees year after year for the last five seasons

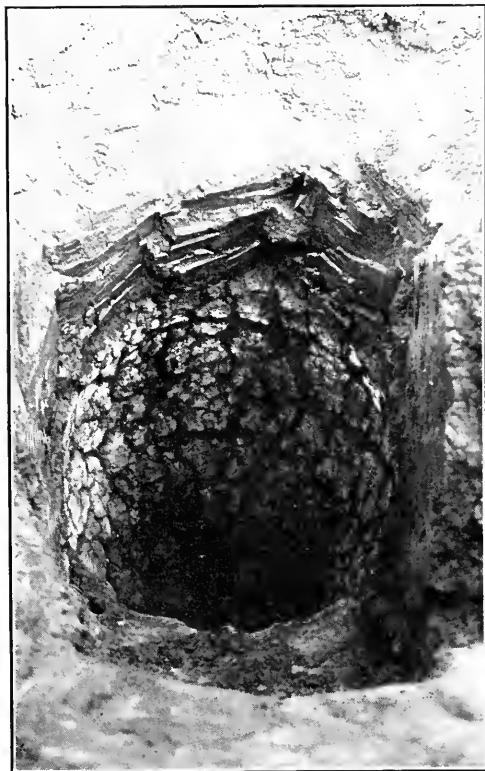


FIG. 9. A dynamited hole showing the cracked-up subsoil.
(By courtesy of DuPont Powder Company.)

and taking notes on the resulting stand, I am becoming more and more impressed that greater care should be taken in planting pecan trees than any other kind of nursery stock. To get that enormous tap-root of the pecan tree safely out of the nursery row into its permanent home in the orchard must require some care. The less of exposure and injury to the root in this transfer the better result in living trees. Many good pecan trees die because they find soil conditions in the orchard so different from those they left in the nursery. To grow

good thrifty trees, nurserymen take pains to fertilize and cultivate so as to make good soil. A pecan tree leaving such a soil and suddenly finding itself thrust into an impoverished one with an impenetrable wall of clay all about it generally dies from the shock. I believe it pays to make some previous preparation in the orchard prior to setting out pecan trees. After the land is staked off, deep and wide holes should be dug. This gives the roots of the young trees a wider root range in which to become established. For this purpose it is a good practice in planting pecan trees to "shoot" the holes with dynamite before the trees are planted, so that the roots can get down through the impervious layer. It has recently been found that this is the cheapest and most effective way of preparing holes for pecan trees. I have found from experience that 10 cents worth of dynamite, in

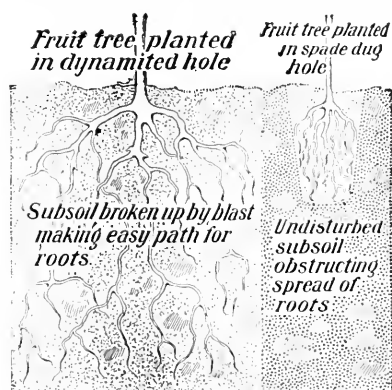


FIG. 10. By courtesy of DuPont Powder Company.

blasting stumps or digging holes, will do more execution than 50 cents worth of labor. By using from one-half to a whole stick of 40 per cent dynamite, placed about 4 feet deep, an impervious subsoil or hard pan can be cracked up and loosened for several feet around. The dirt is not blown out of the hole, as might be expected, but is raised at the surface and a large cavity made in the ground below. It will be found by testing with a crowbar or sharp-pointed stake that it can easily be pushed down into the loosened soil for several feet. When it is desired to plant the tree the topsoil over the opened cavity below can be easily dug away with a spade. Fig. 9 shows a tree hole made by dynamite. The best way to make the hole for dynamite is by the use of a shipbuilder's auger to which a long shank has been welded. A shipbuilder's auger is very heavy and does not have a taper point to break off against obstructions. It will bore quickly through soil, clay, wood, or any ordinary substance. The use of dynamite in pecan planting makes a passage for the tap-root, for it



FIG. 11. A Stuart tree, showing staminate catkins.
(Photo by S. B. Shaw.)

is bound to go down into the soil until it finds the permanent water table. The tap-root is necessarily shortened in transplanting, but when the young tree begins to start, one or more new tap-roots are formed and begin to grow downward. In a dynamited hole pecan roots find a suitable place for rapid development. Fig. 10 shows a diagrammatic representation of a tree planted with and without dynamite. In the entire process of transplanting pecan trees the roots should never be exposed to sun and wind, but should be covered and kept moist until they are finally planted in the orchard. Rich top-soil should be used in filling in the hole and should be firmly packed about the roots.

SELF-FERTILITY AND SELF-STERILITY OF PECAN TREES.

One of the points about pecan trees concerning which least is known is the self-fertility and self-sterility of the bloom. From the nature and position of the flowers it is evident that they depend very largely on the wind for pollination. In Fig. 13 can be seen the long, pendulous staminate catkins which produce the pollen, while at the terminal of the new shoots are shown the pistillate flowers. All the flower buds of the pecan are produced the year previous to fruiting. The staminate ones are in small lateral buds and the pistillate ones in the large terminal buds, which contain also the leaves. The staminate buds start at the terminal and range down the branches for a distance of from 12 inches to nearly 3 feet. See Fig. 12. Since these lateral buds are formed and matured before the terminals, there is less danger of their being killed in the fall by early frost before the tree becomes dormant. The terminal buds which contain the pistillate bloom are always last to mature, and therefore run the greatest risk. In late-maturing and therefore tender varieties the pistillate flowers may be killed in the fall, while the staminate ones mature, go safely through winter, and bloom out normally the following spring. A variety to be a satisfactory nut producer must at least be hardy for the locality in which it is growing. This explains why many southern varieties, although vigorous, fail to produce nuts in northern localities. Their pistillate blooms, which later become the nuts, are killed in the fall because they cannot ripen and become dormant before frost.

When pecan trees begin to bud out in spring it will be noticed that the terminals open first, and are followed a little later by the lateral buds, which open first nearest the terminals and then in succession down the stem. This gradual progression in the budding-out of the staminate catkins lengthens the pollen-producing period and insures fertilization. There are many peculiarities of wind-pollinated plants that for the pecan have not yet been thoroughly worked

out. It may be that to avoid self-pollination the stamens may mature before the pistils (*Proterandry*). On the other hand, the pistils may mature before the pollen is shed (*Proterogyny*). It may even be that the pollen of a tree is infertile with the pistillate blooms on the same tree. In all of these cases the tree would be fruitless. This may explain the unproductiveness of some isolated pecan trees. All these problems will doubtless be worked out and the fertilizing characteristics of each important variety determined, but it will take years to do so. In our experimental orchards we have made a start in this direction by putting in solid-block plantings of four prominent varieties, namely, Stuart, Frotscher, Van Deman, and Schley.



FIG. 12. Staminate flowers of the pecan.

It may be that some of these varieties will not be able to fertilize themselves with their own pollen, and will therefore be unproductive until pollen producers are grafted in. It will require a few years yet to solve all these problems. We have, however, ascertained that the Stuart variety is a wonderfully profuse pollen bearer. A Stuart tree when in bloom can be recognized anywhere in the orchard by its ropes of staminate catkins along the sides of the terminal shoots. The Stuart on account of this habit will undoubtedly be a valuable variety for pollinating sterile sorts.

Until we know definitely all the fertilizing characteristics of standard varieties of pecans, I would not consider it advisable to make

large solid-block plantings of any one variety. A greater or less mixing of varieties will, I feel sure, result in more prolific crops of nuts. A practical way would be to plant the different varieties in alternating strips of two rows to a variety. This would give full advantage of all that could be gained from cross-fertilization and would avoid



FIG. 13. The circles show the position of the pistillate flowers of the pecan. Lower down on the branches can be seen the staminate flowers.

mixing the nuts at gathering time, for the crop of the two rows of the same variety could be harvested on the middle space between.

IS THERE DANGER OF AN OVERPRODUCTION OF PECANS?

In noting the extending area of pecan planting and the large and numerous orchards being set, the question naturally arises, is there danger of the pecan business being overdone and of there being a serious glut of the nut market in the future? Pecan plantings have been so heavy in the last few years that nurserymen have not been able to keep up with the demand for trees. Last fall the supply of

trees was sold out so early in the season that I found it quite impossible to purchase any of the newer varieties for testing. Most of the commercial pecan orchards set a decade ago are now coming into bearing, yet one never sees on the general market the products of these orchards. I have never yet found it possible to purchase Stuart pecans in the open market, yet this is a precocious and productive variety and one that is very widely planted. The pecan nuts of named varieties produced up to the present time have all gone to



FIG. 14. A cart-load of Stuart pecans; 700 pounds that sold for \$350.

(Photo by Mr. C. A. Reed, Department of Agriculture, Washington, D. C.)

special customers at generally fancy prices. From the way in which the products of budded trees are snapped up early in the season it looks as if it would be some time before there would be sufficient to satisfy the fancy trade, let alone the general nut market. The pecan nuts of the general trade come most largely from wild seedling trees in Texas and Louisiana. This natural product will doubtless diminish rather than increase as it meets the competition of the higher-class product from nut orchards of budded and grafted trees being planted every year.

It is interesting further to note that in spite of the increase of nut plantings and the increased production of nuts of all kinds in the United States, that our imports of nuts and nut products have been steadily increasing year after year. For the present year

(1911) they amount to fourteen and a half millions of dollars. In the face of these figures it does not look much like a threatened overproduction of pecans for a very long time to come. Furthermore, in addition to the increasing use of pecans for confectionary, culinary, and dessert purposes, there is an increasing demand for pecan oil, for the pecan is the richest in oil of all vegetable substances. As the pecan is not grown anywhere else in the world except in the United States, the world must get its supply of nuts from us. A nut so fine for dessert and confectionary purposes as the pecan will undoubtedly make a great demand for itself when there are enough of them produced to satisfy our home needs and the world outside learns how delicious they are. There is little reason, therefore, to fear that the pecan industry will be overdone, because it will take many a year even at the present rapid rate of planting to as much as satisfy present demands for these nuts.

A LAST WORD ON PLANTING NUTS AND SEEDLING TREES.

No one who is conversant with recent horticultural progress would think of planting nuts or seedling trees to get a pecan orchard. He would send to a nursery where he could get budded trees of the varieties suited to his locality. Twenty years ago this was not possible, for then there were no budded trees, and the only way to get a



FIG. 15. At (a) is shown a pecan nut and at (c) a bitter nut. At (b) is shown the resulting hybrid.

pecan orchard was by planting nuts or seedling trees. All the older orchards throughout the country were produced in this way. As every seedling tree is a distinct variety, there is of course little or no uniformity in the nuts. On account of the tendency of trees to revert or "breed back" to original ancestors, most of the nuts are small and thick-shelled, even though large, thin-shelled nuts were planted. A more discouraging feature even than this is found in the fact that many times the nuts from seedling trees are bitter, and therefore of no value whatever. The bitterness of many seedling pecans is

explained by the fact that the pecan (*Hicoria pecan*) crosses very readily with the bitter nut (*Hicoria aquatica*). Half of the blood of such a cross would be from stock that has produced bitter nuts for centuries, and never anything but bitter nuts. Such a seedling nut is shown in Fig. 15. On the right is the bitter-nut father and

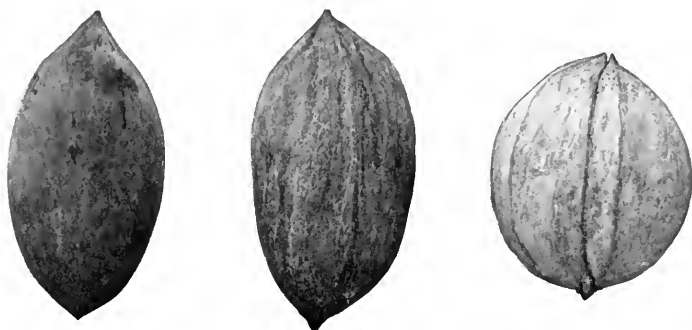


FIG. 16. Pecan and hickory nut, with resulting hican between.

on the left the mother pecan. As the native range of the bitter-nut tree covers a good deal of the country where pecans are grown, it is very easy to account for the numerous bitter seedling pecans. The thinness of shell in so many of the bitter seedling pecans is readily explained by the fact that the bitter nut is uniformly thin-shelled. In the pecan-bitter-nut crosses are found all kinds of intermediate

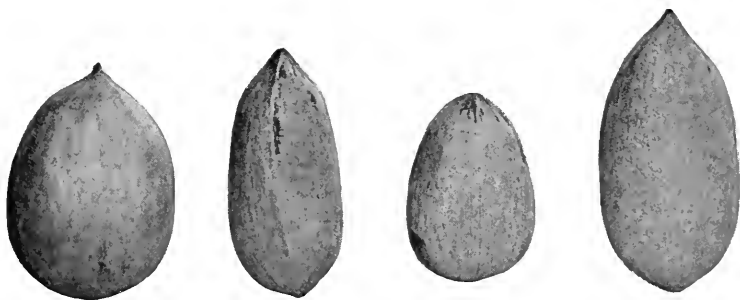


FIG. 17. Nuts from seedling trees all produced by planting nuts from the same tree. Nuts obtained from Mr. T. P. Littlepage, Washington, D. C.

blendings and combinations of the characteristics of both nuts. The pecan also crosses with several species of hickories, giving a race of variously blended intermediate hybrids known as hicans. See Fig. 16.

The following letter gives an experience in raising pecan trees by planting nuts:

PIKEVILLE, N. C., November 22, 1909.

DEAR SIR:—I saw your notice in Bulletin No. 8 (1909), concerning seedling pecans.

I have some seedlings that are good and some not so good and some that are not fit for a hog to eat, that all came from seed planted eighteen years ago. I have cut down some of the largest trees, the nuts of which were very rough and bitter.

My trees all came from one pound of pecans that I bought in Goldsboro, N. C., eighteen years ago. They all looked alike to me, but the nuts produced from them are all different. I have only one out of the whole lot that is good enough to keep. If I could get them I would like to plant some of the budded trees for my children, for I am 68 years old.

I am sending you 80 nuts by mail, so that you can test them for yourself.

Very respectfully,

JOHN T. DEES.

Many similar experiences could be given of the results obtained by planting nuts and seedling pecan trees. Figs. 17 and 18 show the resulting fruit from seedling trees produced from nuts planted from the same tree.



FIG. 18. Nuts from seedling trees, all produced by planting nuts from the same tree.

The following table gives a cracking test of a number of varieties of pecan nuts. It does not give a record of all the varieties growing in the test orchards, but is from our stock collection of nuts. A test of seedling nuts sent in from different parts of the State has been made wherever there was a sufficient quantity of nuts in the sample.

CRACKING TEST OF PECANS.

VARIETIES.	Age of Sample.	Crop of	Number of Nuts per Pound.	Per Cent Meat.	Per Cent Shell.	Per Cent Whole Meats.	Per Cent Broken Meats.	Remarks.
Stuart.....	9 months..	1910	48	53	47	58	42	Stuart is a large, well-filled but thick-shelled nut that is somewhat hard to crack out.
Stuart.....	21 months..	1909	44	46	54	42	58	
Stuart.....	33 months..	1908	44	49	51	47	53	
Van Deman.....	9 months..	1910	54	49	51	59	41	Van Deman is a large, handsome nut.
Van Deman.....	21 months..	1909	47	47	53	63	37	
Van Deman.....	33 months..	1908	54	50	50	49	51	
Schley.....	9 months..	1910	60	63	37	58	42	Schley, the best filled nut.
Schley.....	21 months..	1909	63	61	39	61	39	
Curtis.....	9 months..	1910	92	59	41	82	18	A thin-shelled, full-meated, good-cracking nut.
Curtis.....	21 months..	1909	78	59	41	68	32	
Curtis.....	33 months..	1908	78	60	40	59	41	
Russell.....	33 months..	1908	66	56	44	90	10	A fine cracker.
Teche.....	9 months..	1910	69	51	49	82	18	Shell not well filled; thus comes out easily and gives a large percentage of whole meats.
Teche.....	21 months..	1909	74	45	55	89	11	
Randall.....	33 months..	1908	62	50	50	78	22	Cracks out well.
Kennedy.....	33 months..	1908	63	53	47	62	38	Cracks out well.
Claremont.....	33 months..	1908	65	47	53	60	40	A good, but thick-shelled nut.
Hume.....	33 months..	1908	73	58	42	72	28	Well filled.
Seedling No. 1....	9 months..	1910	94	47	53	87	13	Sent in by Miss E. J. Howland, Beaufort, N. C.
Seedling No. 2....	9 months..	1910	122	39	61	95	5	Sent in by Miss E. J. Howland, Beaufort, N. C.
Seedling No. 3....	21 months..	1909	61	43	57	68	32	Sent in by Mrs. M. Rosenthal, Raleigh, N. C.
Seedling No. 4....	21 months..	1909	73	44	56	47	53	Sent in by Mrs. M. Rosenthal, Raleigh, N. C.
Seedling No. 5....	21 months..	1909	53	36	64	82	18	Sent in by Mrs. M. Rosenthal, Raleigh, N. C.
Seedling No. 6....	21 months..	1909	56	51	49	90	10	Sent in by Mr. J. M. Franck, Richlands, N. C.
Seedling No. 7....	21 months..	1909	56	51	49	95	5	Sent in by Mr. J. M. Franck, Richlands, N. C.
Seedling No. 8....	21 months..	1909	143	44	56	87	13	Sent in by Mr. Howard Haywood, Raleigh, N. C.
Seedling No. 9....	9 months..	1910	75	45	55	63	37	Sent in by Mr. Boswell, Wilson, N. C.
Seedling No. 10....	21 months..	1909	123	50	50	97	3	Sent in by Mr. George N. Ives, New Bern, N. C.
Seedling No. 11....	21 months..	1909	90	53	47	98	2	Sent in by Mr. George N. Ives, New Bern, N. C.
Seedling No. 12....	21 months..	1909	69	49	51	96	4	Sent in by Mr. George N. Ives, New Bern, N. C.
Seedling No. 13....	21 months..	1909	68	60	40	96	4	Sent in by Dr. N. M. Gibbs, New Bern, N. C.
Seedling No. 14....	21 months..	1909	84	51	49	24	76	Sent in by Mr. Koonce, Richlands, N. C.
Seedling No. 15....	21 months..	1909	96	58	42	109	0	Sent in by Capt. B. P. Williamson, Raleigh, N. C.
Seedling No. 16....	9 months..	1910	73	51	49	97	3	Sent in by Mr. T. F. Bagley, Wilmington, N. C.
Seedling No. 17....	9 months..	1910	58	43	57	92	7	Sent in by Capt. H. C. Carter, Fairfield, N. C.
Seedling No. 18....	9 months..	1910	74	50	50	35	65	Sent in by Capt. H. C. Carter, Fairfield, N. C.

From the foregoing tables it will be seen that there is considerable variation in different varieties in the number of nuts to the pound. This is the same as saying that pecan nuts vary much in size and weight. The larger and heavier the nuts of any variety the fewer it takes to make a pound. In the table it will be seen that the nuts vary in size all the way from Stuart, running 44 per pound, to seedling No. 8, of which it requires 143 nuts to make a pound. The large nuts are of course most attractive and valuable. No seedling, the nuts of which run more than 100 per pound, could wisely be recommended for propagation unless there were some other very remarkable characteristics to warrant it.

Often seedlings grade well in size, but have other unfavorable qualities that detract from their value and render them unfit for propagation. It will be seen further from the tables that different samples of the same variety vary in size and weight from year to year. This is true of other crops as well as of pecans. If conditions of growth are especially favorable the nuts will be somewhat larger in size. If the tree be overloaded the nuts will, like other fruits, grade smaller in size.

In cracking out pecan nuts they average on the whole about half meat and half shell. Thin-shelled, well-filled sorts give a larger percentage of meat and a smaller percentage of shell. It will be noticed in the tables that the variety Schley gives as high as 63 per cent of meat and has only 37 per cent of shell, while the Teeche in one sample was as low as 45 per cent of meat with 55 per cent of shell. Many of the seedlings give a still smaller proportion of meat.

The cracking quality of a nut is best shown in the variety that gives the largest number of unbroken meats. Large kernels are necessarily more difficult to get out whole than smaller ones, and this is why small inferior seedlings will so often give a larger percentage of whole meats per pound. Shriveled kernels which separate from the shell will give a larger proportion of whole meats than a variety with a very full and plump kernel that fits the shell snugly. This is another reason why many of the seedling nuts show up so well in the cracking test. There are, however, in this test two seedlings that are remarkable crackers. Seedling No. 15, sent in by Capt. B. P. Williamson of Raleigh, cracked out so perfectly that there was not a single broken kernel in the whole sample. Seedling No. 11, sent by Mr. George N. Ives of New Bern, N. C., gave almost a perfect record. As nuts get old and dry there is a larger per cent of broken kernels than with fresh but mature nuts.

ANALYSES OF PECAN KERNELS.*

VARIETIES.	Per Cent Fats.	Per Cent Protein.	Per Cent Fiber.	Per Cent Nitrogen-free Extract.	Per Cent Ash.	Per Cent Water.	Total Carbohydrates (Nitrogen-free Extract and Fiber).
Stuart, 1910.....	76.67	8.63	1.58	9.01	1.50	2.61	10.59
Stuart, 1909.....	75.98	7.50	1.64	10.87	1.52	2.49	12.51
Stuart, 1908.....	77.51	7.63	1.50	9.27	1.39	2.70	10.77
Van Deman, 1910.....	78.80	8.88	1.50	6.90	1.51	2.41	8.40
Van Deman, 1909.....	76.63	8.44	1.64	9.07	1.67	2.55	10.71
Van Deman, 1908.....	76.11	9.25	1.46	8.86	1.62	2.70	10.32
Schley, 1910.....	80.55	5.81	1.44	8.57	1.25	2.38	10.01
Schley, 1909.....	75.44	9.25	1.46	9.41	1.60	2.84	10.87
Curtis, 1910.....	74.59	9.13	1.33	10.30	1.76	2.89	11.63
Curtis, 1909.....	75.00	9.00	1.42	10.35	1.49	2.74	11.77
Curtis, 1908.....	75.80	8.63	1.46	9.67	1.59	2.85	11.13
Russell, 1908.....	71.80	10.50	1.36	11.72	1.68	2.94	13.08
Teche, 1910.....	73.83	9.69	1.51	9.72	1.95	3.30	11.23
Teche, 1909.....	68.41	10.13	1.39	14.56	2.00	3.51	15.95
Randall, 1908.....	74.21	8.06	1.52	11.74	1.57	2.90	13.26
Kennedy, 1908.....	73.71	9.25	1.32	11.09	1.85	2.78	12.41
Claremont, 1908.....	74.10	9.63	1.50	10.26	1.74	2.77	11.76
Hume, 1908.....	77.24	7.25	1.46	9.75	1.68	2.62	11.21
Seedling No. 1, 1910.....	74.34	9.50	1.47	10.05	1.38	3.26	11.52
Seedling No. 2, 1910.....	67.25	11.00	1.96	13.41	2.27	4.11	15.37
Seedling No. 3, 1909.....	71.46	11.50	1.33	10.91	1.92	2.88	12.24
Seedling No. 4, 1909.....	73.54	12.25	1.23	7.99	1.94	3.05	9.22
Seedling No. 5, 1909.....	67.58	12.06	1.69	12.91	2.06	3.70	14.60
Seedling No. 6, 1909.....	75.19	9.31	1.62	9.39	1.76	2.73	11.01
Seedling No. 7, 1909.....	76.67	9.31	1.50	8.31	1.70	2.51	9.81
Seedling No. 8, 1909.....	66.49	15.25	1.20	11.49	1.93	3.64	12.69
Seedling No. 9, 1910.....	70.42	9.75	1.52	12.87	2.10	3.34	14.39
Seedling No. 10, 1909.....	69.41	12.50	1.24	11.63	2.02	3.20	12.87
Seedling No. 11, 1909.....	71.53	10.00	1.41	12.19	1.88	2.99	13.60
Seedling No. 12, 1909.....	68.31	11.88	1.46	12.81	1.97	3.57	14.27

*These analyses were made by Mr. G. M. MacNider and Mr. H. Hill, of the Division of Chemistry.

The most cursory glance at the foregoing tables will show that pecans are phenomenally high in the quantity of nourishment which they contain in a highly concentrated form. They are the richest in fats of all vegetable substances. They also contain proteids and carbohydrates, but very little water and fiber. It will be noticed that the variety Schley goes as high as 80 per cent of pure oil. Teehe is the lowest named variety in the per cent of oil, but this is higher than that of other classes of nuts. When pecans become more generally grown, not only will they be appreciated for their food value, but their oil will doubtless become an important article of commerce.

DESCRIPTION OF VARIETIES UNDER TEST.



Stuart nut, kernel, and cross-section.

1. **STUART.**—Size large to very large, $1\frac{1}{2} \times 1$ inches; form oblong roundish; color grayish-brown, heavily striped and splashed with purplish black; base rounded; apex blunt; quadrangular; shell smooth, thick, brittle, well filled with rich, fine-grained meat; somewhat hard to crack out.

The Stuart pecan originated in Mississippi. It has been very widely disseminated and has proved itself to be vigorous, early bearing, hardy and productive over a wide range of territory. The tree has a fine, erect habit of growth. This variety is such a profuse pollen bearer that it would appear to be useful for fertilizing other varieties. It is valuable for northern planting.



Van Deman nut, kernel, and cross-section.

2. **VAN DEMAN.**—Large to very large, $2 \times \frac{7}{8}$ inches; form long oval; color dark brown, lightly striped with purplish brown; base pointed; apex long, tapering pointed; shell of medium thickness, cracks out well; partitions thick; kernel plump, light brown; sutures deep and narrow; flavor good.

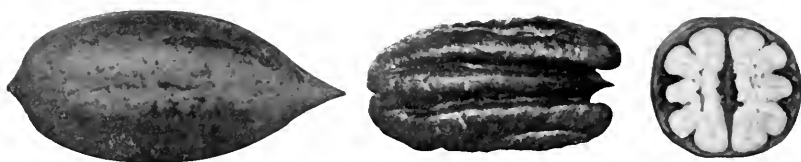
The Van Deman originated in St. James Parish, Louisiana. The tree is a vigorous, handsome grower, and is reported as being an early, though somewhat erratic bearer.



Mantura nut, kernel, and cross-section.

3. **MANTURA.**—Size large, $2 \times \frac{3}{4}$ inches; long, oval; dull brown, much marked with irregular dark purplish stripes; base and apex taper pointed; shell very thin and brittle, cracks easily, giving many unbroken halves; kernel dark straw-color, plump and smooth; sutures wide and shallow, not retaining any portions of shell; texture fine, firm, solid; flavor sweet, nutty; quality good.

This variety originated in Surry County, Virginia. It was named and introduced by Mr. W. N. Roper, editor of the *Fruit and Nut Journal*. The tree is a vigorous, symmetrical grower, very hardy, and is reported as being a heavy bearer. A valuable variety for planting in the northern portion of the pecan area.



Schley nut, kernel, and cross-section.

4. **SCHLEY.**—Size medium to large, $1\frac{3}{4} \times \frac{7}{8}$ inches; oblong oval, flattened; color light reddish brown, plentifully marked with irregular stripes and splashes of purple; base abrupt, pointed; apex sharp pointed, concave, somewhat quadrangular; shell very thin, dense and brittle, always tightly packed with meat; cracks out well, giving a higher percentage of meat than any other variety; kernel of beautiful, light-yellow color, smooth and very plump; sutures smooth, shallow, unretentive; texture very firm and fine-grained; flavor rich, sweet, and nutty; a standard for quality.

The Schley originated at Scranton, Mississippi, and was introduced by Mr. A. J. Delmas. The tree is very vigorous and a beautiful upright grower. In our most southerly planting the Schley has shown itself to be very precocious and promises to be a heavy bearer. It appears to be a little tender for northern planting. A standard for quality and filling, and where it can be grown is one of the choicest varieties.



Curtis nut, kernel, and cross-section.

5. **CURTIS.**—Size medium, $1\frac{5}{8} \times \frac{7}{8}$ inches; ovate conic; color light grayish brown, very free from markings, just a few short, narrow, purplish stripes about the apex; base rounded, nipped; apex slightly concave pointed; shell very thin and smooth, almost invariably well filled; cracks out well; kernel dark straw-color, with small dark spots, very plump; sutures regular, narrow, and shallow; texture firm and fine-grained; flavor very sweet and nutty; a standard for quality.

This variety was originated by Dr. J. B. Curtis at Orange Heights, Florida. In North Carolina this variety is a rather slow-spreading grower with thin willowy twigs and light-colored, narrow foliage. It started to bear with the very earliest and produced many nuts on very small trees.

6. **APPOMATTOX.**—Size medium, $1\frac{1}{2} \times \frac{3}{4}$ inches; form oval, oblong; color light brown; base pointed; apex abrupt, pointed; shell thin, well filled, cracks well; kernel full and plump, of clear light brownish-yellow color; sutures narrow and deep; texture fine and firm; flavor sweet and nutty; quality equal to the best.

This variety originated at Petersburg, Virginia. It was named and introduced by Mr. W. N. Roper. The tree is a vigorous, spreading grower, and is reported as being an annual bearer. This variety is very hardy and is especially valuable for planting in northern and elevated regions.



Frötscher nut, kernel, and cross-section.

7. FROTSCHER.—Size large to very large, $1\frac{7}{8} \times 1\frac{1}{4}$ inches; form oblong; color light yellowish brown, with broad purple stripes and splashes near apex; base blunt, rounded; apex abrupt, quadrangular, tipped; shell thin, slightly corrugated, cracks out well; kernel not solid, often not well filled at lower end; sutures wide; texture flaky, dry, rather coarse; flavor good; quality only fair.

This variety originated in Louisiana. It is reported in the South as an early and heavy bearer. In North Carolina the tree is vigorous, but rather tender for our climate.



Moneymaker nut, kernel, and cross-section.

8. MONEYMAKER.—Size medium, $1\frac{1}{4} \times 1$ inches; roundish ovate; color light brown, with a few purplish splashes about the apex; base broad, rounded; apex short, abrupt, somewhat quadrangular; shell thick, but cracks well; kernel plump and broad with deep regular sutures; texture firm, solid; flavor sweet; quality very good.

This variety was originated and introduced by Mr. Sam H. James of Mound, Louisiana. In North Carolina it has proved to be a hardy, vigorous grower. It is reported as being an early and prolific bearer.



Clark nut, kernel, and cross-section.

9. CLARK.—Size medium to large, $1\frac{3}{4} \times \frac{7}{8}$ inches; long cylindrical; color dull grayish brown, with a few purplish spots about the apex; base round, pointed; apex short, tapering; shell rather thick, brittle; cracking quality medium; kernel plump, but often slack at the lower end; sutures narrow, not very deep; texture firm, quality good.

The tree is fairly hardy in North Carolina, but is not a vigorous grower. This variety has not become popular, and has practically ceased to be propagated.



Russell nut, kernel, and cross-section.

10. **RUSSELL.**—Size medium to large, $1\frac{5}{8} \times \frac{7}{8}$ inches; ovate cylindrical, slightly compressed; color dark brown, marked irregularly with many small dots and dark purplish splashes; base roundish, pointed; apex short, tapering, pointed; shell very thin and brittle, fits the kernel very loosely; cracking quality excellent, kernel usually plump, much wrinkled, sometimes not filled at base; sutures narrow and shallow; partitions thin and corky; texture firm, dry, and fine-grained; flavor sweet, quality good.

The Russell originated at Ocean Springs, Mississippi. It is reported in the South as being a healthy, productive variety. Its fine nuts make it attractive where it can be grown. The tree is a low, sprawly grower. It does not seem to be suitable to the climate of North Carolina, as the trees appear to be rosetted. One of the trees winter-killed to the ground, while the others had their branches badly frozen back.



Dewey nut, kernel, and cross-section.

11. **DEWEY.**—Size medium to large, 2×1 inches; long, ovate pointed; color dark grayish brown, with broad splashes of purplish black near the apex; base abrupt, pointed; apex long, taper-pointed; shell thin, brittle; cracking quality good; kernel bright, plump, smooth and solid; sutures shallow, narrow, and not retentive; texture dry, firm; flavor rich and very sweet, quality very good.

The Dewey originated at Monticello, Florida. It is hardy in southeastern Carolina and grows with a vigorous spreading habit. It bore nuts the fourth season from planting.



Alley nut, kernel, and cross-section.

12. **ALLEY.**—Size medium, $1\frac{1}{2} \times \frac{7}{8}$ inches; form ovate cylindrical; color grayish brown with a few dark purple markings; base rounded; apex blunt pointed, somewhat quadrangular; shell smooth, moderately thin, brittle; cracks out well; kernel plump, bright, straw-color, surface wrinkled; sutures narrow and deep; texture firm and dry; flavor sweet; quality good.

The Alley originated at Scranton, Mississippi. The tree is a vigorous, handsome grower. It bore nuts here the fourth season from transplanting. It is reported as a heavy bearer.



Centennial nut, kernel, and cross-section.

13. CENTENNIAL.—Size large, 2 x 1 inches; oblong compressed, slightly constricted about the middle; color grayish brown, rather bright, a few black stripes and many rusty black dots; base tapering to a blunt point; apex tapering pointed; shell rather thick, brittle; cracking quality fair; kernel long, plump, corrugated; sutures narrow and shallow, secondary sutures well marked; flavor sweet; quality very good.

The Centennial originated in Mississippi. The tree has a drooping habit of growth and is not very vigorous.

This variety is reported by Mr. C. A. Reed, pecan specialist of the National Department of Agriculture, as being abandoned on account of its tardy bearing.



Sweetmeat nut, kernel, and cross-section.

14. SWEETMEAT.—Size small to medium, $1\frac{3}{8} \times \frac{7}{8}$ inches, blunt cylindrical; color light brown, with a few streaks of purplish brown near the apex; base roundish; apex short and abrupt; shell smooth, thin, cracks out well; kernel plump; sutures narrow and deep; texture fine-grained, compact; flavor sweet; quality good.

The Sweetmeat originated at Monticello, Florida. On our North Carolina test orchards the tree is a slow, rather shapely, spreading grower, with thin willowy twigs. It is a little tender here. This variety is reported in the South as being a heavy and regular bearer.



Rome nut, kernel, and cross-section.

15. ROME.—This variety often goes by the synonyms, Columbian, Pride of the Coast, and Twentieth Century. Size large to very large, 2 x 1 inches; form oblong ovate; color grayish, rusty, irregularly splashed with dark purple; base roundish; apex abruptly pointed; shell very thick and hard; cracking quality poor; does not fill well; kernel long, very often shrunken or undeveloped at the base; sutures wide, unretentive; texture coarse and dry; flavor medium, quality only fair.

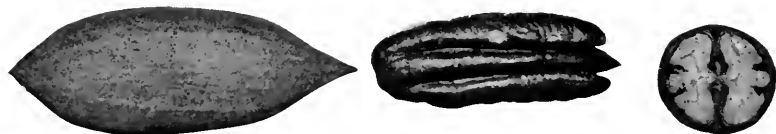
With us the Rome is hardy and is a vigorous upright grower. Mr. C. A. Reed, pecan specialist of the National Department of Agriculture, reports this variety as being discarded on account of its hard shell, shy bearing, and poor filling quality. It is especially susceptible to the attacks of the shuck worm. The tree being a hardy, vigorous grower, is valuable for being worked over to better varieties.



Robson nut, kernel, and cross-section.

16. **ROBSON.**—Size medium, $1\frac{1}{2} \times \frac{7}{8}$ inches; form ovate, compressed; color light grayish brown, irregularly splashed and striped with purplish black; base roundish pointed; apex bluntly tapering; shell thin, cracks out well; kernel plump, solid; sutures wide and shallow; texture firm and fine-grained; quality good.

The Robson originated in Mississippi. With us it is not a vigorous grower. The tree is lacking in symmetry and does not appear to be hardy here.



Atlanta nut, kernel, and cross-section.

17. **ATLANTA.**—Size medium, $1\frac{1}{4} \times \frac{7}{8}$ inches; form long, tapering oval, compressed; color dull gray, with many small dots, narrow stripes near apex; base tapering pointed; apex long, tapering pointed; shell fairly thin, brittle; partitions thick and corky; cracking quality good; kernel long, plump; sutures narrow and shallow; texture firm and compact; flavor sweet; quality very good.

This variety was originated by Mr. G. M. Bacon of Dewitt, Georgia. Mr. C. A. Reed reports it as being abandoned on account of its susceptibility to scab.



Teche nut, kernel, and cross-section.

18. **TECHE.**—Size medium, $1\frac{1}{2} \times \frac{7}{8}$ inches; form ovate conic; dull grayish brown, irregularly splashed with purplish black; base rounded; apex short, pointed, shell of medium thickness, partitions thick and corky; cracks out fairly well; kernel solid, often shrunken; sutures wide and deep; texture firm and dry; quality poor.

This variety originated in Louisiana. It is a poor filler and of low quality. Reported in the South and East as being a very heavy and regular bearer.



Randall nut, kernel, and cross-section.

19. **RANDALL.**—Size medium, $1\frac{1}{2} \times 1$ inches; form ovate oblong; color grayish brown, with purplish stripes and splashes; base roundish; apex abruptly pointed, quadrangular; shell rough, rather thick; cracks fairly well; kernel broad, plump, somewhat corrugated; sutures broad and rather deep; texture firm; flavor sweet and good; quality very good.

The Randall originated with Dr. J. B. Curtis at Orange Heights, Florida. In our test plantings it has shown itself to be a vigorous, erect grower, though somewhat tender here.



San Saba nut, kernel, and cross-section.

20. **SAN SABA.**—Size small, $1\frac{1}{4} \times \frac{7}{8}$ inches; form oblong ovate; color bright yellowish brown, with numerous purple splashes and stripes; base round; apex abrupt; shell very thin and brittle; cracking quality excellent; kernel bright yellow, smooth, and very plump, completely filling the shell; texture firm and very fine; flavor very rich and sweet; quality the very best.

The San Saba was introduced by Mr. E. E. Risien of San Saba, Texas. It is a beautiful little nut of the very highest quality, but it seems impossible to grow it here. All our trees have died.



Senator nut, kernel, and cross-section.

21. **SENATOR.**—Size small to medium, $1\frac{3}{4} \times \frac{7}{8}$ inches; form ovate, distinctly ridged; color dull gray; base round; apex abrupt, pointed; shell thick, partitions thick and corky; kernel full and plump; sutures regular, deep; texture firm; quality excellent.

The Senator originated in Georgia. It is reported as being very prolific in the South; somewhat tender here.



Georgia nut, kernel, and cross-section.

22. GEORGIA.—Size large, $1\frac{1}{2} \times 1$ inches; form round ovate, compressed; dark grayish brown, copiously splashed with dark grayish purple; base round; apex abrupt; shell rather thick, brittle; cracking quality medium; kernel broad, light brown, plump; sutures wide, unretentive; texture open, spongy; flavor sweet; quality very good.

The Georgia was originated by Mr. G. M. Bacon of Dewitt, Georgia. This variety is a very early bearer, but is so subject to scab that it has practically been discarded.

23. LOUISIANA.—Size medium, $1\frac{3}{8} \times \frac{7}{8}$ inches; form oblong cylindrical; color grayish brown, marked with purplish brown near apex; base roundish; apex pointed; shell rather thick; cracks out well; kernel plump; sutures wide and shallow; texture solid; flavor sweet; quality very good.

This variety is, with us, a vigorous, spreading grower, with willowy twigs and narrow, light-colored foliage. The trees bore nuts the fourth year from setting.

24. CAPITAL.—Professor Hume describes this variety as follows: "Size medium to large, $1\frac{3}{8} \times \frac{7}{8}$ inches; ovate oblong, compressed with well-marked sutures; color light brown, streaked and splashed with purplish brown markings from center to apex; base rounded, blunt-tipped; apex abruptly short-pointed, nipped; shell brittle, of medium thickness; partitions of medium thickness; cracking quality very good; kernel plump, filling the shell, brownish yellow in color; primary sutures broad and fairly deep, secondary ones well defined, running almost the length of the kernel; texture rather open; flavor good; quality good."

Though apparently hardy here, the variety has not been a satisfactory grower.

25. MAGNUM.—Professor Hume reports this variety as being of medium size, ovate in form, with thin shell; kernel plump, sweet; quality very good.

In our test orchards it is a spreading grower, but is neither hardy nor vigorous. It is reported as being subject to scab.

26. DALZELL.—Size large, $2 \times \frac{7}{8}$ inches; form cylindrical, flattened; color dull grayish brown; much marked with narrow splashes of purplish brown; base roundish; apex abruptly pointed, quadrangular; shell rather thick, brittle; cracking quality fair; kernel long and narrow; sutures deep; kernel light brown; texture firm; flavor sweet; quality very good.

The Dalzell originated near Gainesville, Florida. With us it is a vigorous upright grower, with heavy, broad foliage. It is a little tender here.

27. MONARCH.—Size large, $2 \times \frac{7}{8}$ inches; form ovate, sloping to both base and apex; color dull grayish brown, splashed with purple; base and apex pointed; shell rather thick; does not crack out well; kernel often poorly filled; sutures shallow, unretentive; texture dry, firm; quality good.

The Monarch was originated at Dewitt, Georgia, by Mr. G. M. Bacon. This variety is somewhat tender in North Carolina.

THE BULLETIN

OF THE

NORTH CAROLINA

DEPARTMENT OF AGRICULTURE,

RALEIGH.

Vol. 32, No. 9. SUPPLEMENT, SEPTEMBER, 1911. Whole No. 157.

ANALYSES OF ILLUMINATING OILS

BY

L. B. LOCKHART, State Oil Chemist,

AND

MANLIUS ORR, Assistant Oil Chemist.

SENT FREE TO CITIZENS ON APPLICATION.

ENTERED AT THE RALEIGH POST-OFFICE AS SECOND-CLASS MAIL MATTER.

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MANLIUS ORR.....	Assistant Oil Chemist.
GEORGE LITTLE.....	Oil Clerk.

RALEIGH, N. C., September 12, 1911.

SIR:-- I submit herewith manuscript covering analyses of illuminating oils sampled February, March and April, 1911. I recommend its publication as a supplement to the September BULLETIN of the Department of Agriculture.

Respectfully submitted,

L. B. LOCKHART,
State Oil Chemist.

To HON. W. A. GRAHAM,
Commissioner of Agriculture.

ANALYSES OF ILLUMINATING OILS.

By virtue of the authority of an act of the General Assembly to provide for the inspection of illuminating oils and fluids (ch. 554, Laws of 1909), the following regulation has been adopted by the Board of Agriculture:

"SEC. 12. The flash test of illuminating oils shall not be less than 100 degrees Fahrenheit, as tested by the Elliott method—closed cup—according to directions prepared by the State Oil Chemist. Illuminating oils which flash below 175° Fahrenheit in the Elliott closed cup shall not contain more than 6 per cent by weight of residue remaining undistilled at 570° Fahrenheit when distilled according to directions prepared by the State Oil Chemist; except that oils of not less than 47° Baumé at 60° Fahrenheit shall not contain more than 10 per cent of residue by weight."

This section has been in force in its present form since December, 1910. These standards should insure a safe oil of at least fair grade.

CARE OF LAMPS.

Poor lights are often caused by the condition of lamps and wicks. The oils which accumulate in the lamp should be thrown out every month and the lamp thoroughly cleaned.

The lamp should be filled and the charred portion of the wick removed each time before lighting.

Use a wick of good quality. The wick is the vital part of the lamp.

New wicks should be supplied every month or two. They should be dried before the fire and put into the oil while still warm. Used wicks should be dried every two weeks. Clogged wicks make poor lights. Don't economize on wicks. They are cheaper than oil or eyesight.

A smoky flame may be due to a cheap burner or an unsuitable chimney. Burner and chimney should be kept clean.

If these directions are followed there will be less complaint of oil and lights.

QUALITY OF KEROSENE.

In judging the quality of a sample of kerosene of satisfactory flash point, the following facts should be considered:

It should be water-white in color and otherwise well refined. A good oil may be ruined by careless treatment in tanks and barrels.

It should show a large per cent of oil boiling below 250° C.

The residue at 300° C. (572° Fahr.) should usually be less than 5 per cent.

The Baumé gravity should be above 43 degrees.

The viscosity should be low.

Sulphur should not exceed .035 per cent in a high-grade oil.

The iodine number should be low, as a high iodine number indicates unsaturated hydrocarbons, which cause a yellowish flame.

Photometric tests should show a steady flame of good quality and good illuminating power. The illuminating power of the best oils does not drop appreciably in a twelve-hour burning test.

The various tests should be taken together in order to get a fair estimate of the sample.

METHODS OF ANALYSIS.

The *viscosity* was determined with an Engler-Ubbelohde viscosimeter for illuminating oils. The viscosimeter for lubricating oils gave viscosities from 1.07 to 1.13, except that the viscosity of sample No. 33 was 1.17.

The *distillation test* was carried out by the continuous Engler method as modified for the official residue test:

"A weighed Engler flask, containing 100 cc. of illuminating oil, is protected by a layer of asbestos on the bulb and neck. A thermometer is inserted in the usual way so that the upper part of the mercury bulb is opposite the lower part of the side neck of the flask. The distillation is conducted in the regular manner over a Bunsen flame, the heat being regulated so as to distil the oil as evenly as possible over a period of approximately 25 minutes. The time of distillation is counted from the time the first drop leaves the condenser until the burner is finally extinguished and removed. The temperature is brought up to the actual corrected temperature of 570 degrees Fahr. a second time after cooling at least 30 degrees Fahr. The corrected temperature is obtained by applying the usual formula for correction for the exposed part of the thermometer. The total period of heating shall not exceed 45 minutes. The residue in the flask is reported in per cent by weight."

The temperature was not corrected at 250° C. With the exception of sample No. 33, the distillation began at 150° to 160° C. and the distillate below 200° C. varied from 26 per cent to 45 per cent.

Sulphur was determined gravimetrically after burning the oil.

The *degree of refining* was determined by comparing the color with Bismarck brown after shaking 100 cc. of the sample with 40 cc. of 1.73 sulphuric acid for two minutes. (See Gill's Oil Analysis, 5th Edition, pp. 23-24, and Holde, 3d Edition, pp. 61-62.) Oils giving a color above 8 are classed as "poorly refined." The test was not applied to the red oils.

The *iodine number* was determined on a one-gram sample by the official Hanus method (Bulletin No. 107, rev., Bureau of Chemistry, pp. 136-137). The results agree approximately with the oils absorbed by fuming (98.0 per cent) sulphuric acid according to the method of Krämer and Böttcher (Holde, p. 36 and pp. 63-66). By the latter method from 6.0 per cent to 13.4 per cent of the oil was absorbed.

The *photometric test* was made by measuring the candle power at the end of the first and twelfth hours after lighting, using as a comparison light a standard electric bulb at 4 watts per candle power. The lamp had a glass reservoir of 600 cc. capacity and was fitted

with a No. 1 sun hinge burner and a No. 27 Macbeth chimney. No. 1 American wicks recently dried were allowed to soak in the oil overnight. The oil level dropped 30 mm. during the burning period. Over 150 cc. of oil remained at the end of each test. Duplicate tests were made on most of the samples.

The Marcy patent burner was found unsuited for this work unless a much longer burning period were adopted.

Too much importance should not be attached to small differences in percentage drop in candle power, as the results are comparable only for the conditions under which the tests were made.

OILS TESTED.

The analyses given are for all samples taken by inspectors during February, March and April, 1911, except samples of mineral seal oil and samples from store tanks. The tests were made on a composite sample of each brand after filtering the oil.

"Tank car" samples are from storage tanks, tank cars and barges.

Where oils have been shipped and sold by different companies the samples have been credited to only one company. Thus oil sold by the North Carolina Oil Company is credited to The Texas Company, and oil shipped by the Gulf Refining Company is credited to the Cape Fear Oil Company.

ANALYSES OF KEROSENE.

Laboratory Number.	Name of Oil.	Name of Oil Company.	Container.	Number of Samples Received.	Flash—Elliott Cup.	Barrel Gravity at 60° F.	Viscosity at 68° F.	Distillate Below 250° C. Per Cent by Volume.	Residue Undistilled at 300° C. (572° F.), Per Cent by Weight.	Sulphur, Per Cent.	Iodine Number (Hanus).	Percentage Drop in Candle Power in 12 Hours Burning.
1	Aladdin Security	Standard Oil Co.	Tank car*	74	104	44.6	1.41	83	2.4	.014	12.8	10.1
1a	do	do.	Barrel*	18	104	44.2	1.40	78	2.5	.007	12.0	9.6
1b	do	do.	Tank car†	50	104	43.1	1.40	83	2.4	.032	15.5	7.1
1c	do	do.	Barrel†	9	102	44.2	1.43	78	2.4	.021	14.9	8.5
2	Diamond White	do	Tank car*	59	104	44.7	1.43	80	2.4	.019	12.5	7.6
2a	do	do.	Barrel*	18	104	44.5	1.43	78	2.7	.025	13.2	7.9
2b	do	do.	Tank car†	40	104	41.8	1.54	73	4.5	.011‡	25.2	12.0
2c	do	do.	Barrel†	3	104	43.1	1.59	68	6.0	.040‡	21.6	-----
3	Water-white	do	Barrel	11	104	44.6	1.47	83	2.7	.019‡	12.7	5.1
4	Pratt's Astral	do.	Barrel	6	108	46.0	1.43	82	2.5	.014	12.8	10.2
5	Carnadine	do.	Barrel	5	104	43.6	1.42	81	2.7	.021	15.6	0.4
6	Railroad Water-white	do.	Tank car	2	106	43.0	1.40	83	2.1	.019‡	16.4	13.9
7	Red Illuminating	do.	Barrel	1	104	41.8	1.53	73	3.6	.041	23.9	-----
8	Aurora	Red "C" Oil Mfg. Co.	Barrel	16	108	44.7	1.47	79	2.7	.071	11.1	5.4
9	Red "C"	do.	Barrel	16	112	47.4	1.51	75	4.2	.005	10.9	16.9
10	White "C"	do.	Barrel	10	112	47.4	1.48	77	3.7	.009	11.3	10.6
11	Red Astral	do.	Barrel	1	112	47.4	1.50	76	4.2	.015	10.3	9.6
12	Aurora Red	do.	Barrel	1	108	45.0	1.46	79	2.9	.086	11.7	-----
13	Crystallite	The Texas Co.	Tank car	21	108	46.4	1.39	83	2.4	.019	8.1	11.4

13a	do	Barrel	18	110	46.5	1.46	84	2.9	.023	7.8	2.5
14	Lone Star	Tank car	3	108	45.9	1.41	84	3.5	.014	8.4	2.1
15	Red Kerosene	Barrel	1	108	46.5	1.39	84	2.9	.021	7.6	-----
16	Blue Grass	Tank car	16	114	42.0	1.54	75	4.7	.025	11.2	5.3
16a	do	Barrel	1	112	42.0	-----	74	4.9	.026	11.8	-----
17	Water-white	Tank car	11	112	42.0	1.54	75	4.5	.022	11.3	6.7
18	Indian Fancy Burning	Tank car	1	114	41.8	1.56	74	4.4	.019	11.0	4.0
19	Bright Kerosene	Tank car	2	106	42.1	1.52	72	5.0	.020	11.9	4.2
19a	do	Barrel	3	112	42.1	1.52	78	3.6	.012	13.8	3.7
20	N. C. Test White	Barrel	3	112	41.8	1.56	73	6.0	.019	11.3	5.7
21	N. C. Test Red	Barrel	2	108	42.6	1.55	72	4.2	.025	12.3	7.8
22	White Star	Tank car	1	110	42.0	1.53	77	4.2	.020	11.5	-----
23	Superba	Barrel	1	108	47.4	1.53	75	5.2	.010	10.5	-----
24	Crystal White	Barrel	7	110	43.1	1.53	73	4.1	.077	11.8	7.5
25	Crystal Red	Barrel	2	106	45.5	1.45	81	2.7	.231	10.9	24.8
26	Water-white	Tank car	6	116	43.7	1.50	82	3.7	.033	9.5	10.4
27	Prime-white	Tank car	2	108	46.5	1.40	84	2.2	.014	7.2	3.2
28	Green Seal Red	Barrel	3	108	46.5	1.57	71	6.0	.015	12.2	19.4
29	Green Seal White	Barrel	2	108	46.5	1.58	70	6.1	.002	11.9	12.5
30	Orion	Barrel	1	102	44.1	1.51	74	4.0	.001	11.8	3.1
31	B. Burning	Barrel	3	110	43.6	1.69	73	8.9	.063†	20.2	18.5
32	Soline	Barrel	2	106	46.7	1.61	70	7.9	.004	11.2	9.2
33	Railway Safety	Barrel	1	146	44.9	1.96	59	8.2	.008	11.7	46.0

*Shipments from Wilmington.

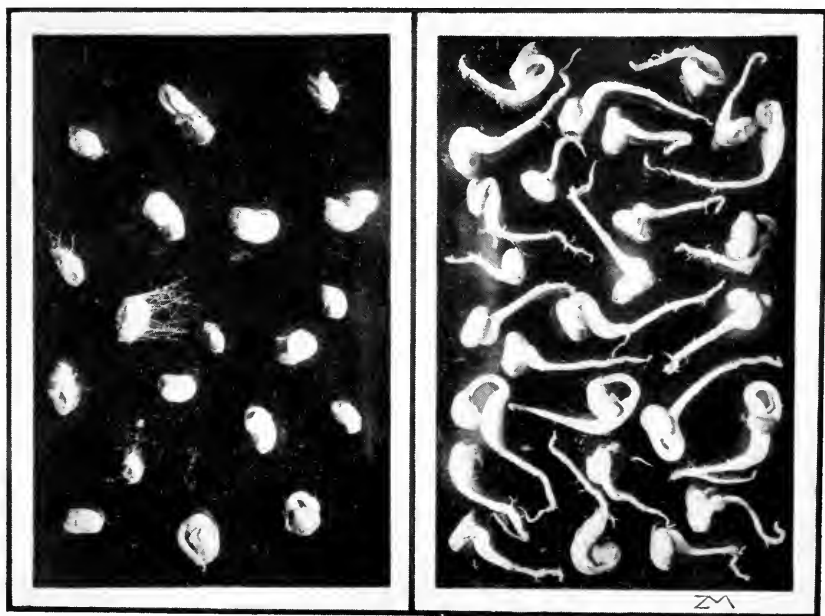
†Interstate shipments, chiefly from Richmond and Norfolk. ‡Poorly refined by test with 1.73 sulphuric acid.

LEAF TOBACCO SALES FOR JULY, 1911.

Pounds sold for producers, first hand.....	116,440
Pounds sold for dealers.....	20,808
Pounds resold for warehouses.....	<u>26,681</u>
Total.....	163,929

THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE,
DIVISION OF BOTANY
RALEIGH.

REPORT ON THE PURITY AND GERMINATION OF AGRICUL-
TURAL AND VEGETABLE SEEDS SOLD IN
NORTH CAROLINA.



No Germination.

100% Germination.

TWO MARKET SAMPLES OF COWPEAS.

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Post-office at Raleigh, N. C., as second-class matter,
February 7, 1901, under Act of June 6, 1900.

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Plant Industry, United States Department of Agriculture.

RALEIGH, October 15, 1911.

SIR:—I submit herewith a report on the purity and germination tests of agricultural and vegetable seeds collected and analyzed in accordance with the North Carolina Pure Seed Act, also samples submitted by correspondents.

The importance and practicability of having seed tested is so vitally associated with successful agriculture that it is the endeavor of this publication to present that problem to the farmers of the State. I recommend that it be published as the October BULLETIN.

Respectfully,

O. I. TILLMAN,

Botanist.

To HON. W. A. GRAHAM,

Commissioner of Agriculture.

PURITY AND GERMINATION OF AGRICULTURAL AND VEGETABLE SEEDS SOLD IN NORTH CAROLINA.

By O. L. TILLMAN, BOTANIST.

THE ESTABLISHING OF SEED TESTING IN NORTH CAROLINA.

It is not the purpose of this publication to be technical, but to present in a helpful manner the seed problem to the farmers of the State. Consideration must be given to the quality of seed sown if productive crops are to be obtained, is a fact which is being recognized. There is no National law governing the importation and sale of poor seed in the United States, but the various Experiment Stations, Departments of Agriculture, and the Seed Laboratory of the United States Department of Agriculture have done an important work in arousing widespread interest in good seed, by furnishing information concerning the different qualities of farm seeds, and the United States Department has aided, by coöperation, various States in establishing seed-testing laboratories. North Carolina is not backward in this forward movement, and has a well-equipped laboratory where accurate tests both for the purity and germination of seeds can be made, and this will gladly be done for any farmer or seed dealer in the State.

An act "To prevent and punish the sale or offering for sale of adulterated or misbranded agricultural and vegetable seed and those lacking viability" was passed by the State Legislature of North Carolina and went into effect July 1, 1909. The act in full is included in this BULLETIN.

The services of Mr. B. Barlow, who remained with this Department until December, 1910, were secured to carry on the work of seed analysis. He spent some time at the Seed Laboratory, United States Department of Agriculture, studying the methods of work and equipment there, which have been practically duplicated by this laboratory. While there, Mr. Barlow had the services of Miss Helen Henry, a scientific assistant of that laboratory, to instruct him in the work of seed analysis. Later, February, 1910, the United States Seed Laboratory began coöperation with this Division in order to aid in establishing the seed-testing work in this State. The coöperation continued until July, 1911. The persons connected with this laboratory in the service of the United States Department of Agriculture were Miss Frances Burket and the writer. Miss Mary Carter Ray and Miss Susan D. Allen have also assisted in the work of seed testing.

This publication gives the results of tests made at the North Carolina Seed Laboratory from February, 1910, to July, 1911. Within that period 936 samples of agricultural seeds and 383 samples of vegetable

seeds were tested. These tests include all samples submitted by inspectors, seed dealers, and farmers. No attempt has been made to report the results of these tests separately.

Each spring and fall inspectors are sent out over the State, who collect samples from the seed which is offered for sale by our local dealers. These samples are sent to the Seed Laboratory and analyzed. A record of the test is kept permanently and the bulks and test separations are kept on file for at least a year after the results have been published, in order that they may be referred to in case of inquiry. When taking the sample the inspectors make a note of the following items: sale name of seed, retail price, bulk represented by sample, name and address of retail and wholesale dealer and whether licensed or not, and the date the sample is collected. We also request that correspondents when submitting samples give the retail price of the seed and the name and address of wholesale and retail dealer. Thus information is obtained concerning the quality of seed for sale in the State.

The laboratory is prepared to test and report promptly on seed samples submitted. First attention is given to the samples submitted by farmers, next those from dealers, and lastly the inspectors' samples are tested. The laboratory is equipped with all the modern seed-testing apparatus. Hasting's triplet lenses and simple tripod magnifiers, as shown in Fig. 1, are used in the ordinary work of separating the foreign seed and inert matter from the pure seed, and a Zeiss binocular is used for the more critical determinations. An analytical balance, seed sampler and mixer, a vertical air-blast seed separator run by an electric motor, and seed sieves of different sized perforations, are the more important apparatus used in making the purity tests. The laboratory has three improved standard germinating chambers heated by electricity and equipped with thermometers, so that it is possible to give the seeds the most favorable temperature for germinating.

THE PURITY TEST.

All the different agricultural and vegetable seeds are tested. The germination test is equally important for all, but the purity test is far more important for some seeds than for others. The clovers and grasses are more apt to be adulterated and impure than the larger seeds, as due to their size the cleaning is more difficult and impurities cannot so easily be detected, and it is, therefore, more important that purity tests be made of these seeds. The test for purity consists in determining the per cent of the sample that is true to name, the per cent of foreign seeds, both weed seeds and other seeds, and the per cent of inert matter, by which is meant broken pieces of seeds, dirt, and particles of quartz.

When the samples are received at the laboratory they are numbered for convenience in filing and for reference. A record is made of the

date the sample is received, by whom submitted, and any additional information that may accompany it. In brief, the details of making a purity test are as follows: the entire sample is put into a mixing and separating machine, which thoroughly mixes the entire lot and divides it into about the approximate amount of the sample to be used for the test. An exact amount of this is then weighed out on an analytical balance. Different amounts are used for the different sized seeds, as less is required for a fair test of the smaller seeds than of the larger ones. The approximate amount used for the various seeds is given in Table II showing the occurrences of foreign seeds, page 12. The definite amount of seed which has been weighed out is placed upon a specially constructed board with sloping arm rests, for convenience in working, and covered with white paper so that the seeds may be seen distinctly, and by means of a pair of small steel forceps the pure seed is separated from the foreign seed and inert matter. Magnifying glasses are also used in doing this work. The three separations are now weighed and the per cent of each determined.

In reporting a test, these per cents are given and also the approximate number and common name of all weed and other seeds that occur per pound of sample. In this way a farmer is able to know just how many and what kind of foreign seeds he sows upon his land by planting this seed, and how much waste matter he is buying. The occurrence of dodder in red clover and alfalfa is so serious that seed should be rejected that contains even a trace of this pest. For this reason, if dodder seed is not found in the regular test of five grams for these seeds, a larger amount of the sample (fifty grams) is examined, and if found, its presence is reported.

The work of making a purity test is really the work of a specialist, but a great deal can profitably be done by the farmers in the way of examining the seeds they buy and determining the impurities. By separating a definite portion of the sample into the three parts, pure seed, inert matter, and foreign seed, an estimate may be made of the impurities without weighing. Seeds of approximately the size of red clover, about a tablespoonful, should be used for an examination, and of the larger seeds more should be used. It is often not as important to know the amount of impurities as the kind, as a few seeds of certain noxious weeds, for instance, dodder, are far worse than a greater number of some less harmful weeds.

An examination should not be attempted without the aid of a magnifying glass. A very good one is shown in Fig. 1, which may be obtained at any bookstore for twenty-five or fifty cents. A reading glass may also be used very successfully and a penknife or paper-knife, in the absence of forceps, may be used in separating the seed; in fact, some persons prefer these to forceps. The seed to be examined, after being

mixed thoroughly, should be turned out on a sheet of white paper on a table or some firm surface, and in good light, before the actual examining is done. This precaution should be taken, as some seeds roll very easily and others are so small as to easily escape notice.



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FIG. 1. Inexpensive Magnifier
for examining seeds.

An advantage in examining seed at home is that the time required to send the seed to the laboratory and get a report is saved, which sometimes means that the entire lot from which the sample was taken has been sold before the report is received. As the best protection the purchaser has against poor seed is the ability to judge the quality of seed for himself, it is hoped that the illustrations of seeds given in this BULLETIN will be helpful in aiding the farmers to determine the weed seeds which are most likely to occur in the principal agricultural seeds, and it is for this purpose that the illustrations are given.

The results of the purity tests are arranged in the following tables:

TABLE 1—RESULTS OF THE PURITY TESTS OF 28 KINDS OF AGRICULTURAL SEEDS, 867 SAMPLES IN ALL.

Kind of Seed.	Total Samples Tested.	Standard Required by Law.	Samples Between 100 Per Cent and Standard.	Total Samples Below Standard.	Samples Between Standard and 60 Per Cent.	Samples Between 60 and 40 Per Cent.	Samples Between 40 Per Cent and 0.	Average Per Cent of Purity.
†Alfalfa. <i>Medicago sativa</i> L.	36	96 $\frac{7}{8}$ %	34	2	2			95.61
Barley. <i>Hordeum vulgare</i> L.	3	98 $\frac{7}{8}$ %	2	1	1			98.42
†Clover, Alsike. <i>Trifolium hybridum</i> L.	8	96 $\frac{7}{8}$ %	6	2	2			97.85
†Clover, Crimson. <i>Trifolium incarnatum</i> L.	119	98 $\frac{7}{8}$ %	58	61	59		2	96.53
†Clover, Red. <i>Trifolium pratense</i> L.	178	92 $\frac{7}{8}$ %	161	17	15	2		96.84
†Clover, White. <i>Trifolium repens</i> L.	5	90 $\frac{7}{8}$ %	5					95.99
Cowpeas. <i>Vigna sinensis</i> Hassk.	3	100	80 $\frac{7}{8}$ %	3				93.93
†Fescue, Meadow. <i>Festuca elatior</i> L.	1	95 $\frac{7}{8}$ %		1	1			85.92
Grass, Billion Dollar. <i>Echinochloa frumentacea</i> (Pursh) Link.	1				80	60 $\frac{7}{8}$ %		71.82
†Grass, Canada Blue. <i>Poa compressa</i> L.	1	90 $\frac{7}{8}$ %		1	1			84.39
Grass, Hungarian Brome. <i>Bromus inermis</i> Leyss.	1	90 $\frac{7}{8}$ %		1	1			72.52
†Grass, Italian Rye. <i>Lolium italicum</i> L.	3	95 $\frac{7}{8}$ %	1	2	2			88.85

flew away to find a mate and then do its share in stinging other lice. An insect which grows to its maturity inside the body of another in this way is known as a true internal *parasite*, and the insect which falls victim to it is a *parasitized insect*. One may find many parasitized lice on cabbage and other crops.

Among the colonies of cabbage lice one may often find some small beetles of yellowish color with black spots and markings. These are "Lady beetles" and they are there for the purpose of eating the lice, so they are beneficial and should be given encouragement. The lady beetles lay eggs which hatch to little bluish colored worms (larvæ) with yellow spots,—these little worms (larvæ) have legs and are quite active, running about over the cabbage and eating a great many of the lice. There are several distinct kinds of lady beetles that devour the cabbage louse.

Also one may find among the cabbage lice small worms, more or less snail-like in shape, which do not have legs. These are larger at the tail end and when feeding they swing the pointed head end about from side to side. When this pointed head end strikes a louse the louse is seized by a pair of very small pointed jaws and held fast while the worm sucks the louse dry and then the empty skin is cast off. Often the worm remains motionless for a long time. These worms are the maggot stage (larvæ) of what are known as "Syrphus Flies," and they are beneficial in that they destroy the cabbage louse. The adult parent *Syrphus* flies are yellow-and-black, two-winged flies and are often seen on flowers or hovering in the air near them.

So far as we know there are no other important enemies of the cabbage louse. Parasites, lady beetles and the *Syrphus* flies are their principal natural enemies. While we should know of these helpful insects and should encourage them all we can, yet we must not depend on them, for while they do perhaps prevent the lice from becoming as destructive as they otherwise would, yet when the lice are once present in great numbers, these natural enemies are not sufficient to prevent damage.

REMEDIES.

There are several different remedies that can be used against the cabbage louse, as well as several methods of prevention.

PREVENTIVE MEASURES.—In the first place the louse will be less likely to become destructive if all weeds are kept down, especially such weeds or seeding plants as are related to cabbage. Do not allow mustard or turnip plants to grow up or go to seed in the spring near the cabbage, as they give a harboring place for lice. Then again, remember that the lice may be on the rough outer leaves that are left on the stem when the head is cut for market, so it is important to destroy all remnants as fast as the heads are cut. These measures will help to keep the lice from becoming numerous.

SOAP SOLUTION.—In our own experience this is the best and most practical remedy for the cabbage louse. We have used it with entire satisfaction, prepared in this way: Take any ordinary brand of laundry (or home made) soap, shave it into thin pieces in water at the rate of

one pound to two gallons water. Put this over fire and bring to a boil and then stir, which will cause the soap to dissolve in the hot water. Now remove from the fire and pour in two gallons of cold water, and it is ready to use. This gives one pound of soap to four gallons of water, and will be fatal to all lice that are wetted by it. It is best applied with a spray pump. As many of the lice will be hidden in wrinkles of the leaves or on the under sides of the leaves it is not easy to reach them all. It is a great advantage to have a boy (barefooted and with sleeves rolled up), go along with the man who is doing the spraying, to turn the leaves quickly from side to side, open and close, etc., so that every inch of surface of every leaf will be reached by the spray. The work can be done *thoroughly* and *rapidly* in this way. It is not nearly so difficult as it may sound from this description. Many persons in this State have used this cheap and simple remedy as result of our recommendations and almost without exception they report good results.

Prof. R. I. Smith, Entomologist of the North Carolina Experiment Station, says:* "It is surprising how easy the cabbage lice may be killed with soap solution. Ordinary strong potash washing soap, or powder, will do the work. Dissolve one pound in about four gallons of water and apply to infested plants with considerable force and in liberal quantities. The lice are often so thickly massed together that those underneath will escape unless the solution is applied as a fine spray and with *force*. A spray pump is quite necessary and should be provided with a short hose and extension rod with a curved end, in order to throw the spray on the under side of the leaves. Failing in this, the leaves must be turned over and the colonies of lice saturated. *Simply sprinkling the tops of infested plants does very little good.*"

All of which is quite in accord with our experience and strengthens the recommendations already made.

OTHER REMEDIES.—Kerosene emulsion at strengths of 10 to 15 per cent oil has been recommended in some other States. Full directions for preparing this are given on page 40. In some experiments which we conducted at Raleigh in 1904, the emulsion at strength of 10 per cent oil did not kill the lice as well as the soap solution already described, while at 15 per cent oil, which did not kill the lice quite satisfactorily, there was a noticeable though not serious scorching of the leaves after a few hours of warm sunshine. A spray solution of whale oil soap has been suggested, but we do not know as the exact proportions have been worked out.

In 1905 a gentleman in Rutherford County reported that he had good success in this way. He filled a barrel with wood ashes and poured in water until it leached through at the bottom. This water had enough lye so that when sprinkled or sprayed on the plants it was fatal to the lice.

From all this discussion of remedies the reader can see that the control of the cabbage louse is neither expensive nor difficult. The two main points are, that it is killed by using solutions of soap, lye, or oil, and that the application must be very thorough.

* Bulletin 197, N. C. Exp. Sta., p. 18.

Goose Grass. <i>Elysiue coracana</i> Gaerth.	1	2	6	6	8	2	1	1	3
Strong-scented Eragrostis. <i>Eragrostis major</i> Host.									2
†Orchard Grass. <i>Dactylis glomerata</i> L.	1	2	6	6	8		2	1	3
††Dog's-tail Grass. <i>Cynosurus cristatus</i> L.						3	1		
*Annual Meadow-grass. <i>Poa annua</i> L.						3			
*Wood Meadow-grass. <i>Poa nemoralis</i> L.									1
††Kentucky Blue-grass. <i>Poa pratensis</i> L.	4	3	6	21	1	59	2	1	3
*Roughish Meadow-grass. <i>Poa trivialis</i> L.			1			3	1		5
††Canada Blue-grass. <i>Poa compressa</i> L.	1	1	2	3	18		1	18	2
Spear-grass. <i>Poa sp.</i>	2		5		1			6	2
Nerved Manna-grass. <i>Panicularia nervida</i> (Willd.) Kuntze.				1	3		1	3	1
†Meadow Fescue. <i>Festuca elatior</i> L.				2		33		1	
*Fescue Grass. <i>Festuca sp.</i>	1	13			5	1	1		8
Upright Brome-grass. <i>Bromus erectus</i> Hud.					1				
†Soft Chess. <i>Bromus hordeaceus</i> L.					7	2	1		
††Chess. <i>Bromus secalinus</i> L.					26	7	36		22
Upright Chess. <i>Bromus racemosus</i> L.					37	6			6

TABLE II—OCCURRENCES OF FOREIGN SEEDS IN 19 KINDS OF AGRICULTURAL SEEDS, 852 SAMPLES IN ALL. CONTINUED.

Foreign Seeds.	Kind of Seed Tested.																		
	Alfalfa. <i>Medicago sativa</i> L.	Clover, Alsike. <i>Trifolium hybridum</i> L.	Clover, Crimson. <i>Trifolium incarnatum</i> L.	Clover, Red. <i>Trifolium pratense</i> L.	Clover, White. <i>Trifolium repens</i> L.	Grass, Kentucky Blue. <i>Lolium perenne</i> L.	Grass, Orchard. <i>Dactylis glomerata</i> L.	Grass, Tall Oat. <i>Arrhenatherum elatius</i> (L.) Beauv.	Millet, Italian or Common. <i>Panicum spicatum</i> (L.) Beauv.	Millet, Pearl. <i>Pennisetum glaucum</i> (L.) Gaertn. and Schult.	Oats. <i>Avena sativa</i> L.	Rape. <i>Brassica Napus</i> L.	Red-top. <i>Agrostis alba</i> L.	Rye. <i>Secale cereale</i> L.	Sorghum. <i>Sorghum vulgare</i> Pers.	Timothy. <i>Phleum pratense</i> L.	Vetch, Spring. <i>Vicia sativa</i> L.	Vetch, Winter. <i>Vicia villosa</i> Roth.	Wheat. <i>Triticum vulgare</i> Vill.
GRASS FAMILY. *Schrader's Brome-grass. <i>Bromus unioloides</i> (Willd.) H. B. K.																			
Brome Grass. <i>Bromus</i> sp.			4	1			1	3											
†*English Rye-grass. <i>Lolium perenne</i> L.			2	2			6	1					1						
†*Italian Rye-grass. <i>Lolium italicum</i> A. Br.			2	2			1					1							
†Darnel. <i>Lolium temulentum</i> L.			1								21						1		
*Rye-grass. <i>Lolium</i> sp.			10	3							1		1						
††Couch-grass. <i>Agropyron repens</i> (L.) Beauv.											1			2					
*Rye. <i>Secale cereale</i> L.			2	1			3				11				1		2	11	1
*Wheat. <i>Triticum vulgare</i> Vill.			1	1			2	2			22	1		33	2		33	2	
*Two-rowed Wheat. <i>Triticum dicoccum</i> Schrank.											4								
*Barley. <i>Hordeum vulgare</i> L.											40			2	1				1

SEDGE FAMILY.											
<i>Cyperaceae J. St. Hil.</i>											
Sedges.											
<i>Cyperaceae J. St. Hil.</i>											
Cyperus.											
<i>Cyperus sp.</i>											
Ovoid Spike-rush.											
<i>Eleocharis ovata (Roth.) R. and S.</i>											
Spike-rush.											
<i>Eleocharis obtusa (Willd.) Schultes.</i>											
Slender Spike-rush.											
<i>Eleocharis tenuis (Willd.) Schultes</i>											
Spike-rush.											
<i>Eleocharis sp.</i>											
Club-rush.											
<i>Scirpus sp.</i>											
Oval-headed Sedge.											
<i>Carex cephalophora Muhl.</i>											
†Sedges											
<i>Carex sp.</i>											
RUSH FAMILY.											
<i>Juncaceae Vent.</i>											
Rushes.											
<i>Juncus spp.</i>											
Common Wood-rush.											
<i>Juncoides campestris (L.) Kunze.</i>											
LILY FAMILY.											
<i>Liliaceae Adans.</i>											
††Wild Onion.											
<i>Allium vineale L.</i>											
NETTLE FAMILY.											
<i>Urticaceae Reichenb.</i>											
Stinging Nettle.											
<i>Urtica dioica L.</i>											

Smart-weed. <i>Polygonum Hydroptery L.</i>	7		2		1	
†Knotgrass. <i>Polygonum aviculare L.</i>	2					
†Black Bindweed. <i>Polygonum Convolvulus L.</i>	1		24		5	1
Knotweeds. <i>Polygonum spp.</i>	48		1		2	
GOOSEFOOT FAMILY. <i>Chenopodiaceae Dumort.</i>	25	2	1	53	2	20
†Lamb's Quarters. <i>Chenopodium album L.</i>	7	2		44	2	16
Fremont's Goosefoot. <i>Chenopodium Fremontii S. Wats.</i>	3			4	1	3
Nettle-leaved Goosefoot. <i>Chenopodium murale L.</i>	2					
Goosefoot. <i>Chenopodium spp.</i>			1		1	1
Saltbush. <i>Atriplex sp.</i>	8					
†Russian Thistle. <i>Salsola Tragus L.</i>	5					
AMARANTH FAMILY <i>Amaranthaceae J. St. Hil.</i>	36				4	1
†Rough Pigweed. <i>Amaranthus retrofractus L.</i>	9					
†Prostrate Amaranth. <i>Amaranthus blitoides S. Wats.</i>	2					
†Tumble-weed. <i>Amaranthus gracilis L.</i>	2					1
Amaranth. <i>Amaranthus sp.</i>	23				4	
CARPET-WEED FAMILY. <i>Aizoaceae A. Br.</i>						1

‡Common Chickweed. <i>Alsine media</i> L.	6	2	3			1
Lesser Stitchwort. <i>Alsine graminea</i> (L.) Britton.	3	4	2			
Chickweed. <i>Alsine</i> sp.	1					1
‡Larger Mouse-ear Chickweed. <i>Cerastium vulgatum</i> L.	2	8	1	46	3	1
‡Thyme-leaved Sandwort. <i>Arenaria serpyllifolia</i> L.	11					25
‡Sandwort. <i>Arenaria</i> sp.	10					
‡Spurry. <i>Spergula arvensis</i> L.			4	2		
‡German Knotgrass. <i>Scleranthus annuus</i> L.		9	1			
CROWFOOT FAMILY.						
<i>Ranunculaceae</i> Juss.	3	36	5		3	1
‡Tall Buttercup. <i>Ranunculus acris</i> L.		6				
Bulbous Buttercup. <i>Ranunculus bulbosus</i> L.		8			2	
‡Creeping Buttercup. <i>Ranunculus repens</i> L.		12				
‡Hairy Buttercup. <i>Ranunculus parvulus</i> L.		5				
Buttercups. <i>Ranunculus</i> spp.	3	5	1		1	1
Ragged Lady. <i>Nigella arvensis</i> L.			4			
POPPY FAMILY.						
<i>Papaveraceae</i> B. Juss.		17	4			1
‡Long Smooth-fruited Poppy. <i>Papaver dubium</i> L.		1				

TABLE II. OCCURRENCES OF FOREIGN SEEDS IN 19 KINDS OF AGRICULTURAL SEEDS, 852 SAMPLES IN ALL—(CONTINUED).

[illegible]

†Indian Mustard. <i>Brassica juncea</i> (L.) Cosson.	2	3	3	15					
††Wild Mustard. <i>Brassica arvensis</i> (L.) B. S. P.	1	31	8	2	1	1	5	1	
†*Rape. <i>Brassica Napus</i> L.		34	13	1	1	1	1	3	1
*Cabbage. <i>Brassica oleracea</i> L.		1							
Mustard. <i>Brassica</i> sp.		1		1					
†Wild Radish. <i>Raphanus Raphanistrum</i> L.							2	1	
*Garden Radish. <i>Raphanus sativus</i> L.		5						1	
Yellow Rocket. <i>Barbarea Barbarea</i> (L.) MacM.	1							3	
†Early Winter Cress. <i>Barbarea prutenica</i> (J. E. Smith) R. Br.			1	1	1		2	1	
Cress. <i>Rorippa</i> sp.								3	
†Shepherd's Purse. <i>Bursa Bursa-pastoris</i> (L.) Britton	1	5		1	31	1		5	2
†False Flax. <i>Camelina sativa</i> (L.) Crantz.	1	16							
†Small-fruited False-flax. <i>Camelina microcarpa</i> Andr.				1					
†Ball Mustard. <i>Neslia paniculata</i> (L.) Desv.							1		
Yellow Alyssum. <i>Alyssum alyssoides</i> (L.) Gouan.		3		3					
Alyssum. <i>Alyssum</i> sp.		1	2						
†Hare's-ear. <i>Cynoglossa orientalis</i> (L.) Dumort.		3	1				3	1	

Everlasting Pea.						
<i>Lathyrus tuberosus L.</i>						2
Vetchling.						1
<i>Lathyrus sp.</i>						1
*Garden Pea.						2
<i>Pisum sativum L.</i>						2
*Cowpeas.						1
<i>Vigna Sinensis Hassk.</i>						1
GERANIUM FAMILY.						
<i>Geraniaceae J. St. Hil.</i>	131	4	3			1
† Carolina Crane's-bill.						
<i>Geranium Carolinianum L.</i>	4					1
† Cut-leaved Crane's-bill.						
<i>Geranium dissectum L.</i>	68	3				1
† Small-flowered Crane's-bill.						
<i>Geranium pusillum Burm. f.</i>	24	1	2			
† Dove's-foot Crane's-bill.						
<i>Geranium molle L.</i>	25		1			1
† Hemlock Stork's-bill.						
<i>Erodium cicutarium (L.) L'Her.</i>	10					
Wild Liquorice.						
<i>Glycyrrhiza lepidota Pursh.</i>						1
WOOD-SORREL FAMILY.						
<i>Oxalidaceae Lindl.</i>						1
† Upright Yellow Wood-sorrel.						
<i>Oxalis stricta L.</i>						1
FLAX FAMILY.						
<i>Linaccae Dumort.</i>						2
*Flax.						
<i>Linum usitatissimum L.</i>						2
Wild Yellow Flax.						
<i>Linum Virginianum L.</i>						1

TABLE II. OCCURRENCES OF FOREIGN SEEDS IN 19 KINDS OF AGRICULTURAL SEEDS, 552 SAMPLES IN ALL. CONTINUED.

[illegible]

[illegible]

Figwort.

Scrophularia sp.

1

†Corn Speedwell.

Veronica arvensis L.

8

Field or Garden Speedwell.

Veronica agrestis L.

1

Speedwell.

Veronica sp.

3

PLANTAIN FAMILY.

Plantaginaceae Lindl.

53

Common Plantain.

Plantago major L.

2

47

†Rugel's Plantain.

Plantago Rugelii Dec.

1

2

30

33

†Buckhorn or Ribwort.

Plantago lanceolata L.

1

2

3

5

†Large-bracted Plantain.

Plantago aristata Michx.

16

7

6

1

1

MADDER FAMILY.

Rubiaceae B. Juss.

48

1

2

1

13

†Blue Button-weed.

Diodia teres Walt.

1

†Cleavers.

Galium Aparine L.

4

1

2

1

13

Cleavers.

Galium sp.

2

†Blue Field-madder.

Sideritis arvensis L.

12

7

VALERIAN FAMILY.

Valerianaceae Hensch.

34

5

†Corn Salad.

Valerianella maritima DC.

2

European Corn Salad.

Valerianella locusta (L.) Beck.

3

1

3

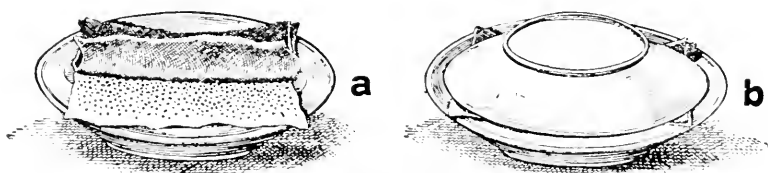
1

†Long-rooted Cat's-ear. <i>Hypochaeris radicata</i> L.										†
†Bristly Ox-tongue. <i>Pieris echinoides</i> L.	2			7						
†Dandelion. <i>Taraxacum Taraxacum</i> (L.) Karst.								7		1
Red-seeded Dandelion. <i>Taraxacum erythrospermum</i> Andr.								1		
†Spiny Sow-Thistle. <i>Sonchus asper</i> (L.) All.			3							3
Wild Lettuce. <i>Lactuca</i> sp.								2		
Smooth Hawksbeard. <i>Crepis virens</i> L.										1
Hawksbeard. <i>Crepis</i> sp.										†
RAGWEED FAMILY. <i>Ambrosiaceae</i> Reichenb.	1		1	63						2
†Marsh Elder. <i>Iva xanthiifolia</i> (Presen.) Nutt.										2
Marsh Elder. <i>Iva</i> sp.									1	
Horse Cane. <i>Ambrosia trifida</i> L.										1
†Ragweed. <i>Ambrosia artemisiifolia</i> L.	1		1	63						1
THISTLE FAMILY. <i>Compositae</i> Adams.	6	1	47	27	1	7	61	3		
Thistles, Undetermined. <i>Compositae</i> Adams.	1		14	1			2			1
Fleabanes. <i>Erigeron</i> spp.							22	1		11
†Black-eyed Susan. <i>Rudbeckia hirta</i> L.						1				13

THE GERMINATION TEST.

Not less important than avoiding impure seeds is the avoidance of seeds having low or no vitality, which fact can be determined only by the germination test. An illustration of the difference in the germinating quality of seeds found on the open market is shown by the illustration on the cover page, of two germination tests of cowpeas. These tests were made at the same time and given identically the same conditions; in fact, the tests were placed side by side in the germinating chamber. In case of one sample there was no germination, while the other germinated 100 per cent. Between these two extremes there are all grades of seeds having high or low germination, and this is true of all the different kinds. As it is possible to obtain good high-grade seed, no farmer should be willing to take the risk of purchasing seed whose germinating quality he did not know nor be satisfied with only a fair-grade seed. Partial or total failure of crops is often due to no other reason than that the seed planted will not grow.

At the laboratory the germination tests can be made somewhat more accurately, as with the germinating chambers the seeds can be given the temperatures most favorable for their growth. Kentucky blue-grass and a few other grasses are given special conditions; they are grown under small glass bell jars and the seedbed is kept saturated by means of a wick extending from a piece of cotton flannel cloth placed under the blotting paper upon which the seeds are germinated down into a tray of water; but in case of the majority of seeds the germination test can successfully be made at home.



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FIG. 2. Simple Germinator for Home Testing.

The sample should be mixed thoroughly, then 100 seeds counted out just as they come, no selection being made. These should then be placed, not touching, on moist cotton flannel cloth or blotting paper between two dinner plates. The simple germinator thus made is shown in Fig. 2. The seeds should be kept at room temperature or at about 70° F. Seeds which sprout quickly are more vigorous than those which take a longer time, and it is, therefore, advisable to make at least two counts of the sprouted seeds, as by doing this the per cent of vigorous seeds can be determined as well as the total per cent that will grow. It is well to make the first count at the end of half the time given the entire test. All good seeds will have germinated in the length of time given for the

test in the germination table, page 40. The number of sprouted seeds indicates the per cent of seeds that will grow under favorable conditions.

The cotton flannel cloth used as a seedbed is torn into strips about the width of a dinner plate and four times as long. It is then doubled once and the seeds placed on half and the other half doubled over them. By folding it in this way it gives a double thickness and retains the moisture better. The cloths should be sterilized by boiling and allowed to cool before using. Blotting paper folded in like manner is also satisfactory, especially for the smaller seeds. Care should be taken that the seeds are kept moist, but not wet, as too much moisture is more injurious than not enough.

The results of the germination tests for both the agricultural and vegetable seeds are given in the following tables.

TABLE III—CONDITIONS AND RESULTS OF THE GERMINATION TESTS OF 32 KINDS OF AGRICULTURAL SEEDS, 936 SAMPLES IN ALL.

Kind of Seed.	Seedbed.	Temperature, Degrees Centigrade.	Duration of Test in Days.	Total Samples Tested.	Standard Required by Law.	Samples Between 100 Per Cent and Standard.	Total Samples Below Standard.	Samples Between Standard and 60 Per Cent.	Samples Between 60 and 40 Per Cent.	Samples Between 40 Per Cent and 0.	Average Per Cent of Germination.
‡Alfalfa <i>Medicago sativa</i> L.	B	20°	6	36	80%	26	10	7	2	1	85.67
Barley. <i>Hordeum vulgare</i> L.	B	20°	6	3	90%	2	1	1			94.50
Bean, Soy. <i>Glycine hispida</i> Maxim.	C	20°-30°	6	1						1	100.00
‡Clover, Alsike. <i>Trifolium hybridum</i> L.	B	20°	6	8	75%	5	3	2	1		74.63
‡Clover, Crimson. <i>Trifolium incarnatum</i> L.	B	20°	4	121	85%	26	95	81	10	1	74.12
‡Clover, Red. <i>Trifolium pratense</i> L.	B	20°	6	177	80%	149	28	26	2		86.08
‡Clover, White. <i>Trifolium repens</i> L.	B	20°	6	5	75%		5	3	2		60.55
Corn. <i>Zea Mays</i> L.	C	20°-30°	6	26	94%	19	7	7			95.40
Cotton. <i>Gossypium herbaceum</i> L.	C	20°-30°	8	25		100.80%		80.60%	10	2	52.34
Cowpeas. <i>Vigna sinensis</i> Hassk.	C	20°-30°	8	4		100.80%	1		2	1	58.25
‡Fescue, Meadow. <i>Festuca elatior</i> L.	B	20°-30°	10	1	85%					1	22.50
‡Grass, Bermuda. <i>Cyniola Dactylon</i> (L.) Kuntze.	T B	20°-35°	21	3		100.80%		80.60%	1		74.00

Grass, Billion Dollar. <i>Echinochloa frumentacea</i> (Roth.) Link.	B	20°-30°	10	1		1	46 00
† Grass, Canada Blue. <i>Poa compressa</i> L.	T B J	20°-30°	28	1	45%	1	35 50
Grass, Hungarian Brome. <i>Bromus inermis</i> Lysg.	B	20°-30°	10	1	75%	1	62 50
† Grass, Italian Rye. <i>Lolium italicum</i> L.	B	20°-30°	14	3	80%	2	37 00
† Grass, Kentucky Blue. <i>Poa pratensis</i> L.	T B J	20°-30°	28	48	45%	45 40% 3	47 40
† Grass, Orchard. <i>Dactylis glomerata</i> L.	B	20°-30°	14	64	70%	30	67 33
† Grass, Tall Oat. <i>Arrhenatherum elatius</i> (L.) Beauv.	B	20°-30°	10	8	70%	5	45 31
† Millet, White. <i>Metidius alba</i> L.	B	20°	6	1		1	41 50
† Millet, Italian or Common. <i>Chadockia italica</i> (L.) Scribn.	B	20°-30°	6	19	85%	4	73 00
Millet, Pearl. <i>Pennisetum spicatum</i> (Cav.) Roem. and Schult.	B	20°-30°	6	8	65%	7	78 44
† Oats. <i>Avena sativa</i> L.	B	20°	6	147	90%	103	80 67
† Rape. <i>Brassica Napus</i> L.	B	20°	6	20	90%	14	86 23
† Red-top. <i>Agrostis alba</i> L.	T B	20°-30°	8	44	70%	39	85 09
Rye. <i>Secale cereale</i> L.	B	20°	6	43	90%	17	86 34
Sorghum. <i>Sorghum vulgare</i> Pers.	B	20°-30°	8	6	80%	4	75 17
Teosinte. <i>Euchlaena mexicana</i> Schrad.	B	30°	8	1		80 60% 1	62 50
† Timothy. <i>Phleum pratense</i> L.	T B	20°-30°	8	44	85%	29	83 91

TABLE III. CONDITIONS AND RESULTS OF THE GERMINATION TESTS OF 32 KINDS OF AGRICULTURAL SEEDS, 935 SAMPLES IN ALL. CONTINUED.

Kind of Seed.	Seeded.	Temperature, Degrees Centigrade.	Duration of Test in Days.	Total Samples Tested.	Standard Required by Law.	Samples Between 100 Per Cent and Standard.	Total Samples Below Standard.	Samples Between Standard and 60 Per Cent.	Samples Between 60 and 40 Per Cent.	Samples Between 40 Per Cent and 0	Average Per Cent of Germination.
† Vetch, Spring. <i>Vicia sativa</i> L.	C	20°-30°	8	5	5	100 80%	5	80 60%	1	1	18 00
† Vetch, Winter. <i>Vicia villosa</i> Roth.	C	20°-30°	8	23	23	100 80%	5	80 60%	9	40	56 87
Wheat. <i>Triticum vulgare</i> Vill.	B	20°	6	39	90%	55	4	3	1		93 05

B. Between blotting paper.

T B. On top of blotting paper.

T B.J. On blotting paper under bell jars.

C. Between fields of cloth.

† Seed illustrated.

TABLE IV—CONDITIONS AND RESULTS OF THE GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 383 SAMPLES IN ALL.

Kind of Seed.	Seedbed.	Temperature, Degrees Centigrade.	Duration of Test in Days.	Total Samples Tested.	Samples Between 100 and 80 Per Cent.				Samples Between 40 and 20 Per Cent.	Samples Between 20 Per Cent and 0.	Average Per Cent of Germination.
					80 Per Cent.	60 Per Cent.	40 Per Cent.	20 Per Cent.			
Beans, Kidney. <i>Phaseolus vulgaris</i> L.	C	20°-30°	6	27	14	7	2	1	3	71.48	
Beans, Lima. <i>Phaseolus lundatus</i> L.	C	20°-30°	6	4	1	2			1	57.50	
Beets. <i>Beta vulgaris</i> L.	Ba	20°-30°	8	11	6	4	1			77.50	
Cabbages. <i>Brassica oleracea</i> L.	B	20°	6	68	27	11	6	8	16	56.42	
Carrots. <i>Daucus Carota</i> L.	B	20°-30°	14	2			1	1		35.55	
Celery. <i>Apium graveolens</i> L.	T B	20°-30°	14	5		1	3	1		48.35	
Corn, Sweet. <i>Zea Mays</i> L.	C	20°-30°	6	13	8	3		1	1	74.09	
Cucumbers. <i>Cucumis sativus</i> L.	B	20°-30°	6	13	5	4	3		1	73.23	
Eggplant. <i>Solanum Melongena</i> L.	B	20°-30°	8	1				1		36.00	
Endive. <i>Cichorium Endivia</i> L.	B	20°-30°	8	1					1	13.00	
Leek. <i>Allium Porrum</i> L.	B	20°-30°	8	1					1	2.50	
Lettuce. <i>Lactuca sativa</i> L.	Ba	20°	4	16	10	2	1	3		77.06	

TABLE IV.—CONDITIONS AND RESULTS OF THE GERMINATION TESTS OF 28 KINDS OF VEGETABLE SEEDS, 383 SAMPLES IN ALL. (CONTINUED.)

Kind of Seed.	Seeded.	Temperature, Degrees	Duration of Test in Days.	Total Samples Tested.	Samples Between 100 and 80 Per Cent.	Samples Between 80 and 60 Per Cent.	Samples Between 60 and 40 Per Cent.	Samples Between 40 and 20 Per Cent.	Samples Between 20 Per Cent and 0.	Average Per Cent of Germination.
Muskmelons. <i>Cucumis Melo L.</i>	B	20°-30°	6	4	2	1		1		71.25
Mustard, Indian. <i>Brassica juncea (L.) Czern.</i>	B	20°	6	19	3	4	1	1	10	37.37
Okra. <i>Hibiscus esculentus L.</i>	C	20°-30°	8	8		3	3	1	1	53.13
Onion. <i>Allium Cepa L.</i>	B	20°-30°	8	8	2		1	1	4	32.81
Parsley. <i>Cerium Petroselinum Benth.</i>	B	20°-30°	28	4		1	1	2		47.50
Parsnips. <i>Pastinaca sativa L.</i>	B	20°-30°	14	6		1	2	1	2	34.17
Peas. <i>Pisum sativum L.</i>	C	20°-30°	6	21	5	8	6	1	1	78.45
Peppers. <i>Capiscum annuum L.</i>	B	20°-30°	8	2				1	1	16.00
Radishes. <i>Raphanus sativus L.</i>	B	20°	4	26	15	6	2		3	73.12
Ruta-baga. <i>Brassica campestris L.</i>	B	20°	6	7	2		5			65.86
Salsify. <i>Tragopogon porrifolius L.</i>	C	20°-30°	10	5	3	1			1	72.90
Spinach. <i>Spinacia oleracea Mill.</i>	B	20°	10	2			1		1	27.50

SUBMITTING SAMPLES.

When sending seed to be tested it is important that the sample fairly represents the bulk from which it is taken. It would be helpful in securing an accurate sample if the following directions were followed: The contents of the package, bag, or barrel should be mixed thoroughly with the hand and arm; take several handfuls from various parts of the package, top, middle, and bottom; mix these well together and take a part of this mixture for the sample. For a fair sample the following amounts of the various seeds should be sent; of the smaller seeds, like red-top, timothy, and red clover, about four tablespoonfuls is a sufficient amount, and of the larger seeds, as oats, wheat, and vetch, about a cupful is necessary.

Samples should be sent by mail, securely wrapped to prevent leakage, and the following information should accompany all samples: Name and address of wholesale and retail dealer, retail price, and name and address of sender. There is no charge for making tests. Address all samples to the Seed Laboratory, North Carolina Department of Agriculture, Raleigh, N. C.

Tobacco seed will also be cleaned for the farmers of the State, and it is highly desirable for all tobacco growers to have their seed cleaned, as the plants from cleaned seed are more vigorous and uniform in size, come on earlier and more nearly at the same time, and the yield and profit of the crop is materially increased. One North Carolina farmer writes us that the crops from cleaned seed in his neighborhood were 50 per cent greater than the crops from uncleaned seed. A vertical air-blast seed separating machine, equipped with an adjustable gauge, so that any desired strength current may be obtained, is used for cleaning the seed. No charge is made for doing this work.

POOR AND ADULTERATED SEED.

In agriculture there are often unavoidable losses, but the loss and disastrous results occasioned by planting poor seed is within the control of the purchaser, and the serious effects of such an oversight cannot be too strongly emphasized. The difference in the price of cheap low-grade seed and high-priced good-grade seed should be no consideration whatever, as even the sum paid for the poor seed is often an entire loss, but this is slight in comparison with the loss of time and labor, the failure to obtain a crop, and the introduction of noxious weeds upon the land, often to such an extent that the production of certain crops is interfered with or made impossible; for instance, wild mustard on wheat land. All of these losses are caused by planting poor seed.

Seeds are poor for a number of reasons: low vitality, due to age; immaturity or improper conditions of harvesting and storing; impurity, due to the presence of other commercial seeds than those of the sale name, weed seeds, quartz particles sifted to the proper size, and other

inert matter; any of these may be present by deliberate adulteration or otherwise. The opportunities for adulteration vary greatly with the different kinds of seeds, as the size, form, and color of some are not conspicuously different from those of much cheaper and less desirable seeds which are often used as adulterants. Some seeds which can successfully be adulterated are the grasses, alfalfa, and red clover, while other seeds as white and alsike clover have form and color more strikingly peculiar to each, and other kinds of seeds cannot be so successfully employed as adulterants.

It is not so serious when commercial seeds are used as adulterants as when noxious seeds are used. The chief objection to the use of commercial seeds as adulterants, is that the purchaser does not get the crop he desires, and that he pays a higher price than the value of the seed. Illustrations of the adulteration of agricultural seeds, with other commercial seeds, are English rye grass and meadow fescue used to adulterate orchard grass; red-top adulterated with white clover and timothy; Kentucky blue-grass adulterated with Canada blue-grass; crimson clover adulterated with common millet; and winter vetch adulterated with spring vetch. A test of winter vetch made at this laboratory a short time ago was adulterated 75 per cent with the cheaper and inferior spring vetch seed. The adulteration of alfalfa and red clover with trefoil and burr clover (not the commercial burr clover, but an inferior, imported seed) is more serious; and of still graver seriousness is the presence, in large amounts, of noxious seeds like cheat, wild mustard, wild carrot, ox-eye daisy, buckhorn, and dodder. Such seeds should be generally known, and it is believed that the effort required in learning them is thoroughly justified, as the sowing of seed which contain seeds of these pernicious weeds could then be avoided. By referring to the illustrations, it is hoped that the farmer may familiarize himself with these impurities. Besides being sown along with agricultural seeds, weeds may also be introduced upon land by the use of unground feed-stuff, which often contains a high per cent of noxious weed seeds.

Seeds are not only adulterated, but are often misbranded. Illustrations of this are seeds labelled "Fancy Kentucky Blue-grass," "Genuine Fancy Kentucky Blue-grass," "Strictly Choice Kentucky Blue-grass," and all being entirely Canada blue-grass. Other samples which have come to our notice had equally high-sounding names and were adulterated with Canada blue-grass from 35 per cent to 55 per cent. Clovers and other seeds besides grasses are also often misbranded.

Weeds upon the farm is not a matter to be considered lightly, as their injurious effects are many, they impair the quality and reduce the quantity of the crop in which they occur, besides being injurious to the land upon which they are allowed to grow by using up plant food and moisture from the soil. They make the preparation and cultivation of the land more difficult and render a place unsightly. Some weeds are poisonous, often causing much loss. A number of inquiries have been

received at this office concerning the poisoning of stock in the State by eating water hemlock. Weeds also harbor injurious insect pests and plant diseases, and the increase in number and kind is an occasion of no slight concern.

Weeds are able to thrive and hold their own so well for a number of reasons, some of which are the enormous production of seeds, the time of ripening their seeds, either before or at harvest time, the great vitality of some seeds, the admirable adaptation for seed dispersal by water, air, and animals, and some weeds are hard to control because of creeping root-stocks and tubers, as nut grass.

Practically all of the seed placed on the market by our local dealers is obtained from larger dealers outside the State, as there is no seed production of commercial importance in the State. A fair and accurate rating of the seed dealers, relative to the quality of seed they handle, who do business in the State cannot at this time be given, as the work of seed testing has not been carried on at this laboratory sufficiently long, nor has a sufficient number of samples been tested to do this. But the work has forcibly demonstrated that all grades of seeds are on the open market, and that the seeds of no one dealer were found to be uniformly high grade. All the dealers from whom we tested seed were found to sell different grades, some good, some indifferent, and some very poor, so that the name of no one dealer can be taken as a guarantee of good seed any more than price can be taken as an absolute guide in purchasing seed, as inferior seed is often sold at the price of good seed.

Although there are no seed-producing areas in the State of commercial importance, in some sections farmers raise seed which they sell to neighboring farmers or local seed dealers. This seed without an exception was found to be inferior, and in some cases was worse than the poorest seed of dealers which came to the notice of this laboratory. Locally produced seed is apt to be low-grade because the farmers take no precaution to keep the fields free from weeds and they do not have the necessary machinery to separate the weed seeds from the agricultural seeds after they are once harvested together. In some cases the locally grown seeds not only contained a high per cent of inert matter and were badly infested with weed seeds, but were of low germination, due to harvesting before they were mature. Locally grown seeds would, of course, be the best to plant if they were pure and of high germination.

Poor seed are perhaps more the result of carelessness than intentional fraud, although that is not at all uncommon and is extensively practiced by some dealers. The chief cause of poor seed is the demand of the farmers for cheap seed regardless of the quality, and, therefore, the dealers meet their demand, although much could be done to improve this condition if dealers would be interested in handling good seed and would point out to their customers the virtue of buying good seed even if it were higher priced. The speediest and most efficient way to improve

the equality of seed which is placed on the market is for the farmers to be able to judge the quality of seed and to be willing to pay a fair price for good seed.

The names and addresses of wholesale firms who were found to sell adulterated seed in the State are given below. As almost the entire stock of local dealers is obtained from wholesale dealers, it is not deemed justifiable, at this time, to publish the local dealers.

WHOLESALE DEALERS WHO WERE FOUND TO SELL ADULTERATED SEED IN THE STATE.

Beveridge, S. T. & Co., Richmond, Va.
 Bolgiano, J. & Son, Baltimore, Md.
 Brent, C. S., Lexington, Ky.
 Dickinson Co., The A., Baltimore, Md.
 Diggs & Beadles, Richmond, Va.
 Henderson, C. W. & Co., Knoxville, Tenn.
 Mayo Milling Co., Richmond, Va.
 National Seed Co., Louisville, Ky.
 Nungesser, Henry & Co., New York, N. Y.
 Savage & Son, N. R., Richmond, Va.
 Smith Feed and Seed Co., Danville, Va.
 Union Seed Co., Bristol, Tenn.
 Wood, T. W. & Sons, Richmond, Va.

The following table shows the cases of adulteration which were found in the different agricultural seeds tested. No case is reported where the adulteration was not 5 per cent, although in many cases the combined per cent of foreign seed far exceeded that amount.

TABLE V. THE ADULTERATION OF AGRICULTURAL SEEDS. CONTINUED.

Seeds Used as Adulterants.

Sale Name of Seed and Number of Samples Tested.	Alfalfa.	Barley.	Blue-grass, Canada.	Blue-grass, Kentucky.	Clover, Crimson.	Clover, White.	Grass, Italian Rye.	Grass, Meadow Fescue.	Grass, Orchard.	Millet, Italian or Common.	Oats.	Red-top.	Timothy.	Vetch, Spring.	Wheat.
‡ Vetch, Winter 22														32	
do														25	
do														22	
do														18	
do														18	
do														16	
do														15	
do														10	
do														9	
do														8	
do														6	
do														5	

‡ Seed illustrated.

TABLE VI. CAUSE AND PER CENT OF UNLAWFUL SAMPLES OF 23 KINDS OF AGRICULTURAL SEEDS, 572 SAMPLES IN ALL.

Kind of Seed.	Total Samples Tested.	Samples Unlawful.	Samples Below Standard for Purity.	Samples Below Standard for Germination.	Samples Containing Unlawful Weed Seeds.
Alfalfa. <i>Medicago sativa</i> L.	36	20, or 55%	1, or 3%	11, or 31%	12, or 33%
Barley. <i>Hordeum vulgare</i> L.	3	1, or 33%	1, or 33%		
† Clover, Alsike. <i>Trifolium hybridum</i> L.	8	4, or 50%	2, or 25%	3, or 38%	
† Clover, Crimson. <i>Trifolium incarnatum</i> L.	121	108, or 89%	23, or 24%	94, or 78%	31, or 26%
† Clover, Red. <i>Trifolium pratense</i> L.	178	77, or 43%	14, or 7%	25, or 14%	63, or 35%
† Clover, White. <i>Trifolium repens</i> L.	5	5, or 100%		5, or 100%	2, or 40%
Corn. <i>Zea Mays</i> L.	26	7, or 27%		7, or 27%	
† Fescue, Meadow. <i>Festuca elatior</i> L.	1	1, or 100%	1, or 100%	1, or 100%	1, or 100%
† Grass, Canada Blue. <i>Poa compressa</i> L.	1	1, or 100%	1, or 100%	1, or 100%	
Grass, Hungarian Brome. <i>Bromus inermis</i> L.	1	1, or 100%	1, or 100%	1, or 100%	
† Grass, Italian Rye. <i>Lolium Italicum</i> L.	3	3, or 100%	2, or 67%	3, or 100%	2, or 67%
† Grass, Kentucky Blue. <i>Poa pratensis</i> L.	48	38, or 79%	33, or 69%	17, or 35%	
† Grass, Orchard. <i>Dactylis glomerata</i> L.	64	49, or 77%	26, or 41%	30, or 47%	32, or 50%
† Grass, Tall Oat. <i>Arrhenatherum elatius</i> (L.) Beauv.	8	8, or 100%	3, or 38%	5, or 63%	7, or 88%
† Millet, Italian or Common. <i>Chaetochloa Italica</i> (L.) Scribn.	19	15, or 79%	1, or 5%	15, or 79%	
Millet, Pearl. <i>Pennisetum spicatum</i> (Cav.) Roem. and Schult.	8	4, or 50%	3, or 38%	1, or 13%	
† Oats. <i>Avena sativa</i> L.	147	104, or 71%	61, or 42%	43, or 29%	68, or 46%
† Rape. <i>Brassica Napus</i> L.	20	6, or 30%	1, or 5%	6, or 30%	1, or 5%
† Red-top. <i>Agrostis alba</i> L.	44	35, or 80%	35, or 80%	5, or 11%	1, or 2%
Rye. <i>Secale cereale</i> L.	43	40, or 93%	29, or 67%	25, or 58%	30, or 70%
Sorghum. <i>Sorghum vulgare</i> Pers.	6	3, or 50%	3, or 50%	2, or 33%	
† Timothy. <i>Phleum pratense</i> L.	44	17, or 39%	2, or 4%	14, or 32%	2, or 4%
Wheat. <i>Triticum vulgare</i> Vill.	39	14, or 36%	2, or 5%	4, or 10%	13, or 33%

† Seed illustrated.

SUMMARY.

1. It is of great economic importance that all agricultural seeds be tested before they are sown.

2. North Carolina has a seed-testing laboratory where seed will be tested and tobacco seed cleaned for the farmers of the State, and without charge.

3. Seed should be tested both for purity and germination.

4. The purity test is necessary, as seeds are often adulterated, misbranded, or contain a high per cent of noxious weed seeds, or inert matter.

5. To make accurate purity tests require some special apparatus and skill, but profitable examinations of seeds may be made by the purchaser at home.

6. The germination test is important, as seeds are often of low or no vitality, and for this reason cause partial or total loss of crops.

7. In case of all the ordinary farm seeds germination tests can be made successfully at home, and thus save the time required to receive a report from the laboratory.

8. Care should be taken to prevent the introduction of noxious weeds upon land, as they are difficult to eradicate and often cause permanent injury to the land upon which they grow.

9. The illustrations of seeds are given in this BULLETIN in order to aid the farmer to determine seed impurities, and thus prevent the planting of agricultural seeds which contain pernicious weed seeds.

10. When submitting samples for testing, give name and address of wholesale and retail dealer, retail price, and name and address of sender. Securely wrap all samples, and address to the Seed Laboratory, North Carolina Department of Agriculture, Raleigh, N. C.

EXPLANATION OF PLATES.

The figures of the following plates are illustrations of agricultural seeds and weed seeds which occur as impurities. It is hoped that by consulting the illustrations the farmers may be aided in determining the purity of seeds. A magnifier such as shown in Fig. 1 is most helpful in examining seeds.

In referring to the illustrations, the term "seed" is used in its popular sense, since in many instances what is called the seed is more properly a seed-like fruit containing a true seed. Examples of this are the grasses, buttercup, field-madder, ragweed, and dandelion.

Grass seeds have a kernel, or grain, which is usually covered by one or two more or less persistent pairs of chaffy scales. In some cases these scales fall away, leaving the grain free, as in case of wheat and rye. These pairs of scales are referred to as the "outer hull" and "inner hull." If both are present, this is indicated by "hull double." Illustrations of seeds with single hull are oats, Kentucky blue-grass, and orchard grass, while sweet vernal-grass and crab-grass are seeds with double hulls. Examination of the figures of grass seeds on plates I and II will further make this designation clear.

The purpose of the brief descriptions is to supplement the illustrations by the noticeable characters and to state the commonest occurrences of the seeds as impurities. The shape, markings, and natural size of the seeds appear in the illustrations.

The figures in the plates are given in the sequence and, as far as possible, named according to Britton's Manual, third edition. The scientific names are given for accurate identification, as in many sections the common names differ.

PLATE I.

Showing seeds natural size and enlarged.

- a. **Johnson-grass** (*Sorghum Halepense* (L.) Pers.) Hull single, polished, chocolate-brown or straw-colored. In millets and cereals.
- b. **Field Paspalum** (*Paspalum laeve* Michx.) Hull double, straw-colored. In Japan clover.
- *c. **Tall Paspalum** (*Paspalum dilatatum* Poir.) Hull double, flattened, straw-colored, hairy (Trade name, Pallas Grass).
- d. **Slender Paspalum** (*Paspalum setaceum* Michx.) Hull double, straw-colored. In red clover and coarse grasses.
- e. **Small Crab-grass** (*Syntherisma linearis* (Krock.) Nash.) Hull double, the outer gray, hairy; inner black. In clovers and grasses.
- f. **Large Crab-grass** (*Syntherisma sanguinalis* (L.) Dulac.) Hull double, straw-colored. In clovers, grasses, and cereals.
- g. **Barnyard-grass** (*Echinochloa Crus-galli* (L.) Beauv.) Hull double, outer straw-colored, hairy; inner lighter, polished. In alfalfa, clovers, grasses, and cereals.
- h. **Witch-grass** (*Panicum capillare* L.) Hull double, outer brown; inner gray, polished. In domestic alfalfa, clovers, grasses, and cereals.
- *i. **Broom Corn Millet** (*Panicum miliaceum* L.) Seed mostly in single, polished hull, straw-colored, gray, or brown. Occasionally in grasses and cereals.
- j. **Spreading Panicum** (*Panicum proliferum* Lam.) Seed similar to h, but larger and relatively longer. In domestic alfalfa, clovers, grasses, and cereals.
- k. **Tall Smooth Panicum** (*Panicum virgatum* L.) Hull usually single, gray, polished. In domestic alfalfa.
- l. **Yellow Fox-tail** (*Chaetochloa glauca* (L.) Scribu.) Hull single or double, outer papery, straw-colored; inner cross-ridged, straw-colored, brown, or green. In clovers, coarse grasses, and cereals.
- m. **Green Fox-tail** (*Chaetochloa viridis* (L.) Scribu.) Hull single or double, outer thin, papery, straw-colored; inner rough, brown mottled, or greenish. In alfalfa, clovers, grasses, and cereals.
- *n. **Italian or Common Millet** (*Chaetochloa Italica* (L.) Scribu.) Hull single or double, outer thin, straw-colored; inner shining, yellowish. In alfalfa, clovers, grasses, and cereals.
- o. **Bur Grass** (*Cenchrus tribuloides* L.) Outer bur-like hull seldom found, free brown grain found in domestic alfalfa.
- *p. **Reed Canary-grass** (*Phalaris arundinacea* L.) Seeds occurring mostly in the polished hair brown inner hull. Rarely an impurity.
- *q. **Sweet Vernal-grass** (*Anthoxanthum odoratum* L.) Hull double, outer brown, hairy, two-awned; inner brown, polished. In imported clovers and grasses.
- r. **Poverty-grass** (*Aristida dichotoma* Michx.) Seeds as found bear the inner, mottled awn-tipped hull. In red clover and especially Japan clover.
- *s. **Timothy** (*Phleum pratense* L.) Hull single, light colored, often absent; grain gray, dull, finely roughened. An impurity of all farm seeds.
- t. **Slender Fox-tail** (*Alopecurus agrestis* L.) Hull double, straw-colored, smooth; the grain soft. In imported crimson clover.
- u. **Marsh Fox-tail** (*Alopecurus geniculatus* L.) Hull double, flat, hairy, brown or straw-colored. In grasses.
- *v. **Meadow Fox-tail** (*Alopecurus pratensis* L.) Structurally similar to u, larger, light straw-colored or brown. In grasses.
- *w. **Red-top** (*Agrostis alba* L.) Hull single or double, outer straw-colored; inner silvery white; grain amber colored. In farm seeds generally.
- x. **Velvet-grass** (*Holcus lanatus* L.) Hull double, outer straw-colored, with short hairs; inner smooth shining. In clovers and grasses.

PLATE I.



PLATE II.

showing seeds natural size and enlarged.

- a. **Tufted Hair-grass** (*Deschampsia caespitosa* (L.) Beauv.) Hull single, white or straw-colored, hairs and a bristle at the base. In grasses.
- b. **Wavy Hair-grass** (*Deschampsia flexuosa* (L.) Trin.) Similar to a. but longer and brown. In grasses.
- *c. **Common Oat** (*Avena sativa* L.) Hull single, mostly smooth, sometimes awned.
- †d. **Wild Oat** (*Avena fatua* L.) Hull single, straw-colored or brown, hairy or only so at the base, a twisted awn from middle, scar ringlike. In cereals.
- *e. **Tall Oat-grass** (*Arrhenatherum elatius* (L.) Beauv.) Hull single, nearly cylindrical, awned at base, straw-colored. In coarse grasses.
- *f. **Bermuda-grass** (*Cyniola Dactylon* (L.) Kuntze.) Hull single, flattened, smooth, straw-colored. In clovers and grasses.
- g. **Molinia** (*Molinia caerulea* (L.) Moench.) Hull single, brown, dull. In European clovers and grasses.
- *h. **Orchard Grass** (*Dactylis glomerata* L.) Hull single, straw-colored, curved and pointed. In clovers and grasses.
- *i. **Dog's-tail Grass** (*Cynosurus cristatus* L.) Hull single, brown, the pointed apex yellow and rough. In European clovers and grasses.
- *j. **Kentucky Blue-grass** (*Poa pratensis* L.) Hull single, light brown, usually acute at ends, side veins distinct. In clovers and grasses.
- *k. **Canada Blue-grass** (*Poa compressa* L.) Hull single, lighter colored than j. more blunt at ends, side veins indistinct. In clovers and grasses, especially alsike clover and Kentucky blue-grass.
- l. **Rat's-tail Fescue-grass** (*Festuca Myuros* L.) Hull single, straw-colored, rough, slender-awned. In clovers and grasses generally.
- *m. **Meadow Fescue-grass** (*Festuca elatior* L.) Hull single, straw-colored. Stem cylindrical, expanded at apex.
- n. **Soft Chess** (*Bromus hordeaceus* L.) Hull single, flattened, light straw-colored, wrinkled, awned. In coarse grasses.
- †o. **Cheat** (*Bromus secalinus* L.) Hull single, nearly cylindrical, straw-colored, smooth, usually awned. In coarse grasses and cereals.
- *p. **English Rye-grass** (*Lolium perenne* L.) Seeds similar to m. differ particularly in the flattened, wedge-shaped stem.
- *q. **Italian Rye-grass** (*Lolium italicum* A. Br.) Seeds differ from p chiefly in the slender awn from the apex. In grasses.
- r. **Darnel** (*Lolium temulentum* L.) Seeds structurally similar to q. but larger and more robust. In cereals.
- †s. **Couch-grass** (*Agropyron repens* (L.) Beauv.) Seed clusters and single seeds similar to m and p. Found in cereals and awnless brome grass.
- t. **Sedges** (*Carex* spp.) Seeds brown, both free and covered by flattened, flask-shaped hull. Found mostly in grasses.
- †u. **Wild Onion** (*Allium vineale* L.) Bulblet's covering papery, white, straw-colored, or purple. In cereals, particularly wheat.
- *v. **Hemp** (*Cannabis sativa* L.) Seeds gray, smooth, veined. In millets and cereals.
- w. **Field Sorrel** (*Rumex Acetosella* L.) Seeds smooth, amber colored, shining, often covered by reddish hull. In farm seeds generally.
- x. **Curled Dock** (*Rumex crispus* L.) Seeds beechnut-shaped, reddish brown, shining. In farm seeds generally.

*Agricultural seed.

†Unlawful seed.

PLATE II.

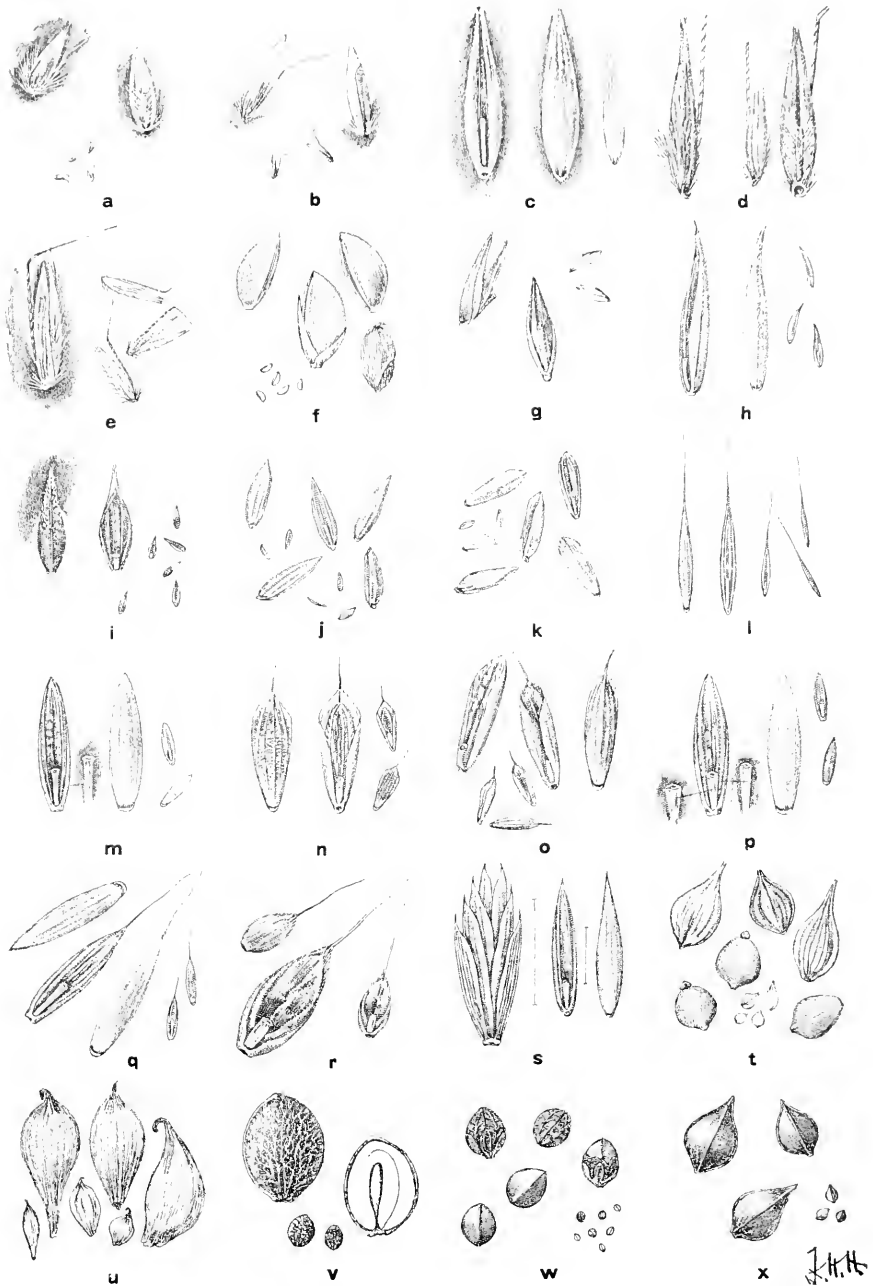


PLATE III.

showing seeds natural size and enlarged.

- a. **Dock-leaved Persicaria** (*Polygonum lapathifolium* L.) Seeds chestnut brown, dull, faces concave, sometimes with brown papery hull. In clovers, grasses, and cereals.
- b. **Pennsylvania Persicaria** (*Polygonum pennsylvanicum* L.) Seeds black or brown, shining. In red clover, grasses, and cereals.
- c. **Lady's Thumb** (*Polygonum persicaria* L.) Black, shining. Common in clovers, alfalfa, grasses, and cereals.
- d. **Knotgrass** (*Polygonum aviculare* L.) Brown, dull. In clovers, alfalfa, grasses, and cereals.
- e. **Black Bindweed** (*Polygonum convolvulus* L.) Black, dull, hull gray. In grasses and cereals.
- f. **Lamb's Quarters** (*Chenopodium album* L.) Black or gray and shining, hull brown. In farm seeds generally.
- g. **Halberd-leaved Orache** (*Atriplex hastata* L.) Hull brown, seed black or gray. In European alfalfa, red and crimson clovers.
- h. **Wild Saltbush** (*Atriplex truncata* (Torr.) A. Gray.) Hull persistent, straw-colored or brown. In domestic alfalfa.
- i. **Russian Thistle** (*Salsola Tragus* L.) Seed brown or green, hull brown or straw-colored. In domestic alfalfa.
- j. **Rough Pigweed** (*Amaranthus retrofractus* L.) Black, shining, oval lens-shaped. In farm seeds generally.
- k. **Prostrate Amaranth** (*Amaranthus blitoides* S. Wats.) Similar to j. but larger, more convex and circular. In domestic alfalfa.
- l. **Tumble-weed** (*Amaranthus gracilis* L.) Similar to k. but much smaller. In all farm seeds.
- m. **Purslane** (*Portulaca oleracea* L.) Black, oval, flattened. Rarely found in clovers and grasses.
- †n. **Corn Cockle** (*Agrostemma Githago* L.) Brown or black, very rough. Mostly in grasses, millets, and cereals.
- o. **Night-flowering Catchfly** (*Silene noctiflora* L.) Dusty gray, tubercles not in distinct rows. Common in red and alsike clovers and cereals.
- p. **Forked Catchfly** (*Silene dichotoma* Ehrh.) Brown, tubercles in distinct rows. In European alfalfa and red clover.
- q. **White Campion** (*Lychnis alba* Mill.) Light gray, tubercles black tipped. In European red and crimson clovers and coarse grasses.
- r. **Cow-herb** (*Vaccaria Vaccaria* (L.) Britton.) Black, spherical, surface finely tubercled. In domestic alfalfa and cereals.
- s. **Common Chickweed** (*Alsine media* L.) Reddish brown, flattened, tubercled. In farm seeds generally.
- t. **Large Mouse-ear Chickweed** (*Cerastium vulgatum* L.) Reddish, tubercles darker. In clovers, grasses, and cereals.
- u. **Thyme-leaved Sandwort** (*Arcutaria serpyllifolia* L.) Black, minute. In clovers and grasses.
- v. **Sandwort** (*Arcutaria* sp.) Gray or mottled. In European crimson clover.
- w. **Spurry** (*Spergula arvensis* L.) Black, rim lighter, thick lens-shaped. In clovers and grasses.
- x. **Knawel** (*Sceleranthus annuus* L.) Straw-colored. In crimson clover and grasses.

†Unlabeled seed.

PLATE III.

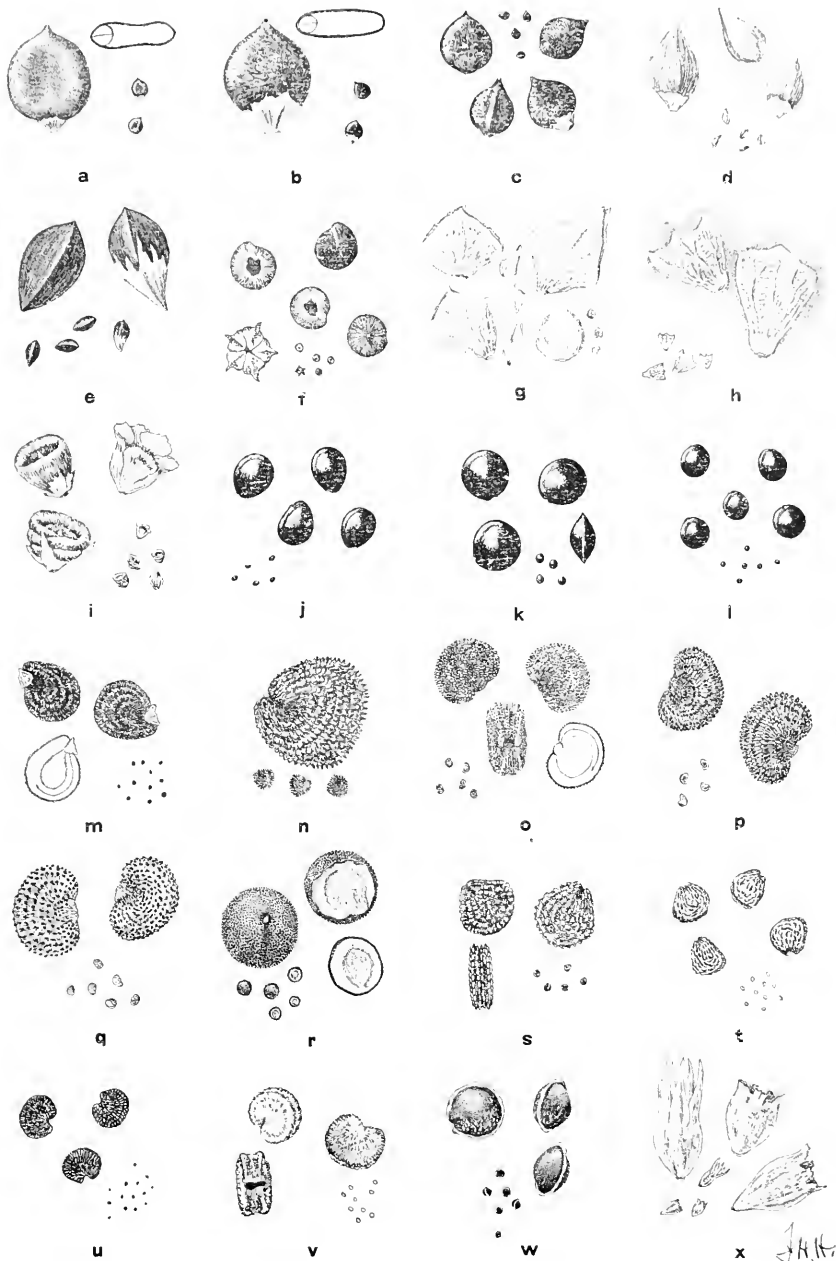


PLATE IV.

showing seeds natural size and enlarged.

- a. **Tall Buttercup** (*Ranunculus acris* L.) Dark brown, flat. In coarse grasses.
- b. **Creeping Buttercup** (*Ranunculus repens* L.) Reddish brown, flat. In clovers and coarse grasses.
- c. **Hairy Buttercup** (*Ranunculus parvulus* L.) Dark brown, flat, surface slightly tubercled. In European crimson clover and grasses.
- d. **Opium or Garden Poppy** (*Papaver somniferum* L.) Gray, slightly flattened. In imported clovers, grasses, and millets.
- e. 1. **Poppy** (*Papaver* sp.) Gray; 2. **Field Poppy** (*P. Rhoeas* L.) Brown; 3. **Long Smooth-fruited Poppy** (*P. dubium* L.) Brown. Found in European crimson clover.
- f. **Field Cress** (*Lepidium campestre* (L.) R. Br.) Dark reddish brown. In clovers, grasses, and cereals.
- g. **Wild Pepper-grass** (*Lepidium Virginicum* L.) Reddish yellow, flat. In farm seeds generally.
- h. **Field Penny-cress** (*Thlaspi arvense* L.) Dark brown. In clovers, grasses, and cereals.
- i. **Hedge Mustard** (*Sisymbrium officinale* (L.) Scop.) Yellowish or greenish tinged. In domestic alfalfa, clovers, grasses, and cereals.
- j. **Tall Sisymbrium** (*Sisymbrium altissimum* L.) Light yellowish red tinged. In alfalfa, clovers, grasses, and cereals.
- k. **Black Mustard** (*Brassica nigra* (L.) Koch.) Brown, pitted, taste pungent. In clovers, grasses, and cereals.
- l. **Indian Mustard** (*Brassica juncea* (L.) Cosson.) Reddish brown, slightly pungent, pitted or netted surface. In grasses, millets, and cereals.
- †m. **Charlock or Wild Mustard** (*Brassica arvensis* (L.) B. S. P.) Black or brown, slightly pungent, nearly smooth, spherical. In clovers, grasses, millets, and cereals.
- *n. **Rape** (*Brassica Napus* L.) Black, surface granular, slightly pitted, not pungent. In farm seeds generally.
- o. **Wild Radish** (*Raphanus Raphanistrum* L.) Pod sections brown or straw-colored, each having one reddish seed. In cereals and vetches.
- p. **Early Winter Cress** (*Barbarea praecox* (J. E. Smith) R. Br.) Gray, granular. In domestic crimson clover and cereals.
- q. **Shepherd's Purse** (*Bursa Bursa-pastoris* (L.) Britton.) Reddish yellow. In farm seeds generally.
- r. **False Flax** (*Camelina sativa* (L.) Crantz.) Light or reddish yellow. In flax and cereals.
- s. **Small-fruited False Flax** (*Camelina microcarpa* Andr.) Reddish brown. In alsike clover, timothy, and cereals.
- t. **Ball Mustard** (*Nastia paniculata* (L.) Desr.) Brown or straw-colored pods, surface coarsely pitted. In crimson clover, flax, and cereals.
- u. **Hare's-ear** (*Conringia orientalis* (L.) Dumort.) Dark brown, granular. In clovers, flax, millets, and cereals.
- v. **Rough Cinquefoil** (*Potentilla Monspeliensis* L.) Light brown, oval, lens-shaped. Commonest in alsike clover, timothy, and cereals.
- w. **Salad Burnet** (*Sanguisorba Sanguisorba* (L.) Britton.) Light brown, spindle shaped. In European crimson clover and coarse grasses.
- x. **Low or Pasture Rose** (*Rosa humilis* Marsh.) Brown, smooth, shape variable. Chiefly in cereals.

*Agricultural seed.

†Unlawful seed.

PLATE IV.

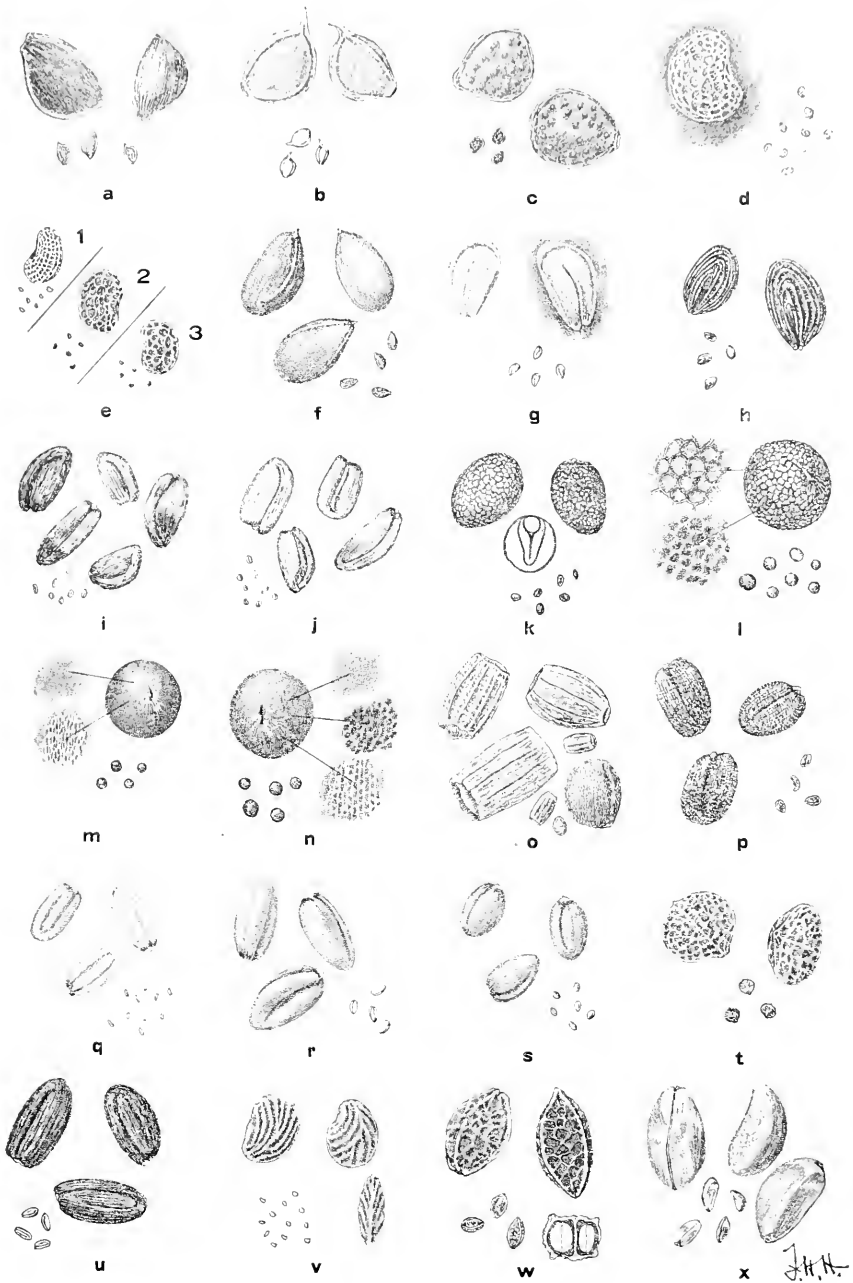


PLATE V.

Showing seeds natural size and enlarged.

- a. Sensitive Pea (*Cassia nititans* L.) Black, shining, flattened, surface pitted. In Japan clover.
- *b. Alfalfa (*Medicago sativa* L.) Greenish yellow or light brown, kidney-shaped or angular. Occasionally in farm seeds.
- c. Black or Hop Medic (*Medicago lupulina* L.) Color as in b, oval, a projection on one side; mature pods black. In farm seeds generally.
- d. Toothed Medic (*Medicago denticulata* Willd.) Similar to alfalfa, but mostly larger. An adulterant of European alfalfa.
- e. Spotted Medic (*Medicago Arabica* All.) Similar to alfalfa, but some seeds larger, light, a projecting point at one side. In red clover.
- f. White Melilot (*Melilotus alba* Desr.) Light brown, elliptical, surface smooth, often uneven. Adulterant of domestic alfalfa, and in clovers and cereals.
- g. Yellow Melilot (*Melilotus officinalis* (L.) Lam.) Yellowish or light brown, surface smooth, even, often purplish mottled. In clovers, grasses, and cereals.
- h. Small-flowered Melilot (*Melilotus indica* (L.) All.) Brown, short oval, surface rough. In alfalfa and clovers.
- i. Kidney Vetch (*Anthyllus Vulvaria* L.) Greenish at broad end, yellowish or pinkish at the other. In European crimson clover.
- j. Low or Smaller Hop-clover (*Trifolium procumbens* L.) Light yellow, shining. In clovers and grasses.
- *k. Crimson Clover (*Trifolium incarnatum* L.) Light pink, shining; old seed reddish and dull.
- l. Rabbit-foot Clover (*Trifolium arvense* L.) Greenish yellow. In red, crimson, and alsike clovers.
- *m. Red Clover (*Trifolium pratense* L.) Violet, yellow, or variegated, has slight luster; reddish brown and dull when old. Occasionally in other farm seeds.
- *n. Alsike Clover (*Trifolium hybridum* L.) Light green to very dark green, often mottled; reddish when old. In other farm seeds, especially timothy.
- *o. White Clover (*Trifolium repens* L.) Light yellow and pinkish, slightly smaller than alsike. In farm seeds generally.
- p. Bird's-foot Trefoil (*Lotus corniculatus* L.) Brown, usually mottled. In European alfalfa and red clover.
- *q. Ax Seed (*Coronilla scorpioides* Koch.) Purplish red, dull. In European alfalfa and red clover.
- *r. Japan Clover (*Lespedeza striata* (Thunb.) H. & A.) Pods brown; seeds purple, mottled, shining. Not an impurity of farm seeds.
- s. Hairy Tare (*Vicia hirsuta* (L.) Koch.) Reddish or light brown, usually mottled, shining. In crimson clover, vetches, and cereals.
- *t. Common or Spring Vetch (*Vicia sativa* L.) Brown or gray, usually mottled, scar light.
- u. Common or Spring Vetch (*Vicia sativa* L.) Variety of t, jet-black, spherical, scar black. In vetches and cereals.
- *v. Hairy or Winter Vetch (*Vicia villosa* Roth.) Grayish black, spherical, scar broad and brown.
- *w. Esparcette (*Ombrychus sativa* Lam.) Pods brown, coarsely pitted; seeds brown. Occasionally in coarse grasses.
- *x. Serradella (*Ornithopus sativus* Brot.) Pod sections brown, flattened, ridged lengthwise. In coarse grasses.

*Agricultural seed.

PLATE V.

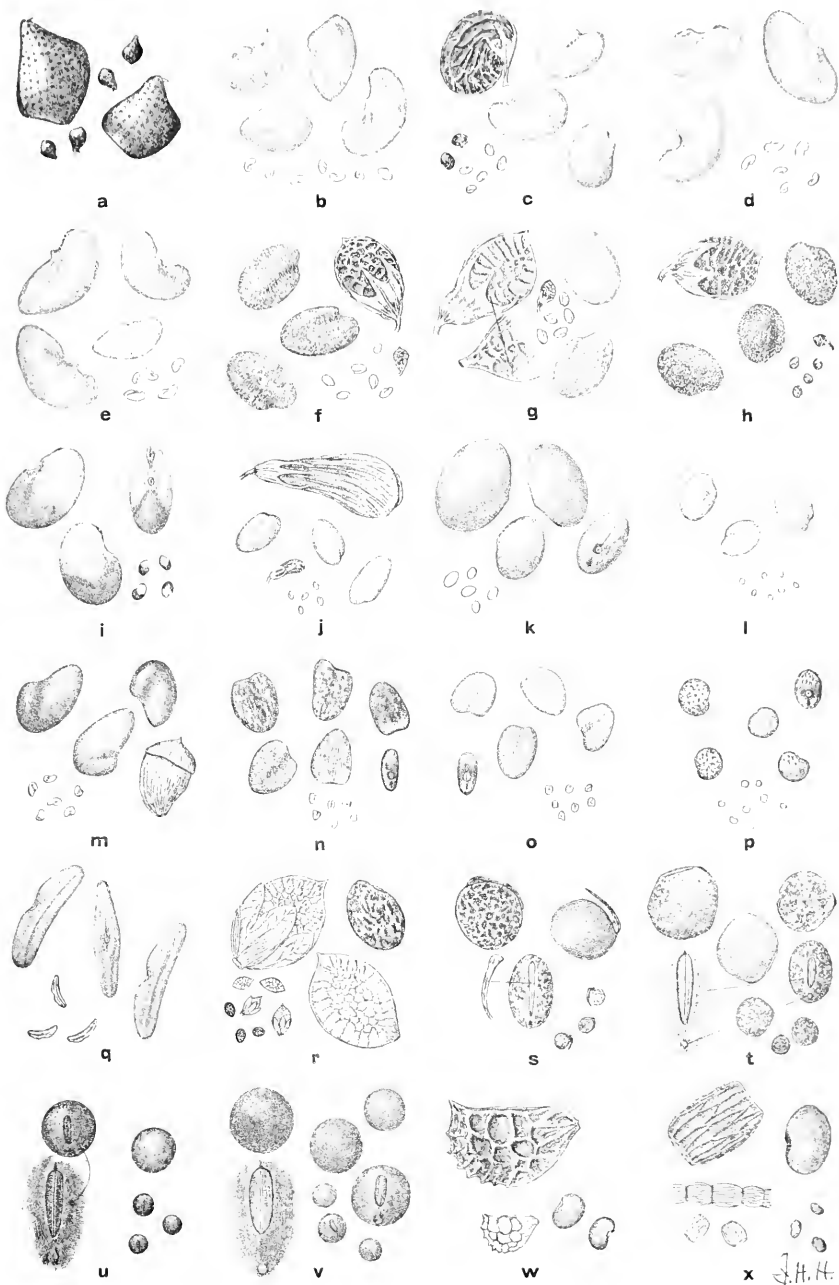


PLATE VI.

Showing seeds natural size and enlarged.

- *a. **Fenugreek** (*Trigonilla focatum-graceum* L.) Yellowish brown, scented. In coarse grasses and cereals.
- b. **Carolina Crane's-bill** (*Geranium Carolinianum* L.) Pinkish brown, surface finely netted. In American-grown crimson clover.
- c. **Cut-leaved Crane's-bill** (*Geranium dissectum* L.) Brown or gray, pitted. In European crimson and red clovers and grasses.
- d. **Small-flowered Crane's-bill** (*Geranium pusillum* Burn. f.) Pods gray, seeds light brown. In European clovers.
- e. **Dove's-foot Crane's-bill** (*Geranium molle* L.) Pods brown, cross-ridged; seeds light brown. In European clovers and grasses.
- f. **Hemlock Stork's-bill or Alfilaria** (*Erodium cicutarium* (L.) L'Her.) Seeds brown; pods reddish brown and hairy. In alfalfa, clovers, and grasses.
- g. **Upright Yellow Wood-sorrel** (*Oxalis stricta* L.) Reddish gray, flattened. In clovers.
- h. **Virginia Three-seeded Mercury** (*Acalypha Virginica* L.) Brown or gray, usually mottled. In domestic clovers.
- i. **Large or Upright Spotted Spurge** (*Euphorbia nutans* Lag.) Light or dark steel gray. In clovers and grasses.
- j. **Mallow** (*Malva* sp.) Seed gray or brown; pod wrinkled, brown. In European alfalfa and clovers.
- k. **Prickly Sida** (*Sida spinosa* L.) Seeds brown, dull; pod brown, wrinkled, forked. In domestic alfalfa and red clover.
- l. **Common St. John's-wort** (*Hypericum perforatum* L.) Black, roughened, minute. In small seeded clovers and grasses.
- m. **Pansy** (*Viola tricolor* L.) Yellow or reddish. In European clovers and grasses.
- n. **Common Evening-primrose** (*Onagra biennis* (L.) Scop.) Reddish brown, dull. In clovers, grasses, and cereals.
- o. **Sinuate-leaved Evening-primrose** (*Oenothera laciniata* Hill.) Light brown, surface indented. In American-grown crimson clover.
- p. **Knotted Hedge-parsley** (*Torilis nodosa* (L.) Gaertn.) Gray, rough or spiny. In imported alfalfa, clovers, and grasses.
- †q. **Wild Carrot** (*Daucus Carota* L.) Light brown, flattened, remnants of whitish spines usually on one side. In farm seeds generally.
- r. **Undetermined Species of Carrot Family** (*Umbelliferac* B. Juss.) Gray with light ribs. Common in Chilean red clover.
- s. **Chervil** (*Anthriscus* sp.) Dark green with luster. In European grasses.
- t. **Red or Scarlet Pimpernel** (*Anagallis arvensis* L.) Dull reddish brown, or black where rubbed. In clovers and grasses.
- u. **Small Bindweed** (*Convolvulus arvensis* L.) Gray due to light raised spots. In coarse grasses, millets, vetches, and cereals.
- v. **Flax Dodder** (*Cuscuta Epilinum* Weib.) Gray or brown, seeds single or double. In flax only.
- †w. **Clover Dodder** (*Cuscuta Epithymum* Murr.) Gray or brown, dull, pitted, nearly spherical, minute. In European alfalfa and clovers.
- x. **Small-seeded Alfalfa Dodder** (*Cuscuta plantiflora* Tenore.) Yellow green, or purple, oblong, roughened. Only in Western U. S. alfalfa.

*Agricultural seed.

†Unlawful seed.

PLATE VI.

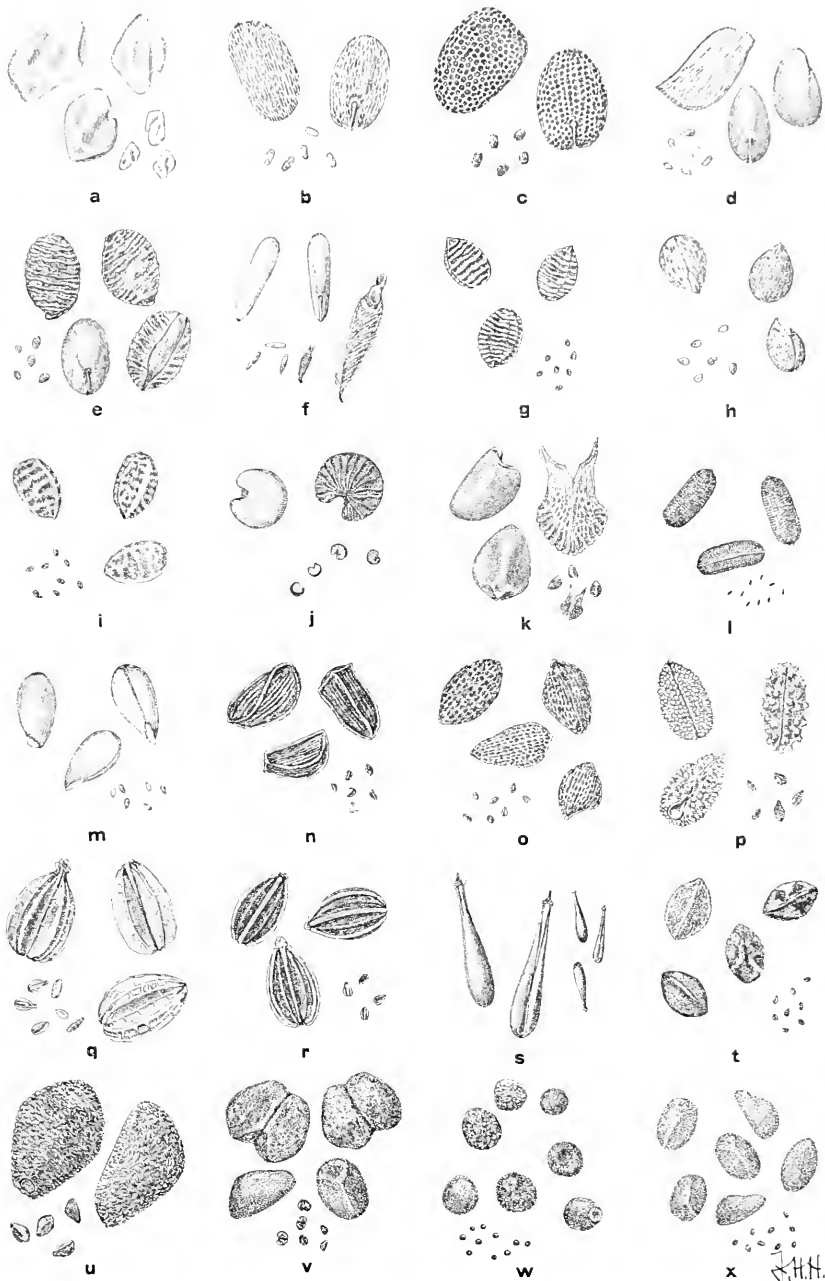


PLATE VII.

Showing seeds natural size and enlarged.

- a. **Field Dodder** (*Cuscuta arvensis* Beprieh.) Pinkish or yellow in U. S. alfalfa; light to dark brown in red clover.
- b. **Large-seeded Dodder** (*Cuscuta indecora* Choisy.) Brown or gray, rough. Only in Western U. S. alfalfa.
- c. **Stickseed** (*Lappula Lappula* (L.) Karst.) Grayish brown, spines often broken off. In alfalfa, clovers, millets, and cereals.
- d. **Field Scorpion-grass** (*Myosotis arvensis* (L.) Lam.) Seeds black, shining. In clovers and grasses. Hulls (*calyces*) hairy, gray. In grasses.
- e. **Corn Gromwell** (*Lithospermum arvense* L.) Gray or brown, texture hard. In alfalfa, clovers, grasses, vetches, millets, and cereals.
- f. **Bluweed** (*Echium vulgare* L.) Brown, angular, rough, otherwise as in e.
- g. **European Vervain** (*Verbena officinalis* L.) Brown or gray on one face, shining between the ribs. In European alfalfa, clovers, and grasses.
- h. **White Vervain** (*Verbena urticifolia* L.) Dark brown or gray on one face, dull, more robust than g. In clovers, grasses, and cereals.
- i. **Blue Vervain** (*Verbena hastata* L.) Reddish brown or gray on one face, dull, slender. In clovers and grasses.
- j. **Catnep** (*Nepeta Cataria* L.) Light brown to dark brown, dull. In alfalfa, clovers, grasses, and cereals.
- k. **Heal-all** (*Prunella vulgaris* L.) Light brown, often shining. In alfalfa, clovers, and grasses.
- l. **Wild Sage** (*Salvia verbenacea* L.) Dark brown, dull. In clovers, grasses, millets, and cereals.
- m. **American Pennyroyal** (*Hedeoma pulegioides* (L.) Pers.) Dark brown, dull. In alfalfa and clovers.
- n. **Black or Garden Nightshade** (*Solanum nigrum* L.) Yellowish, dull, thin. In clovers and grasses.
- o. **Corn or Wall Speedwell** (*Veronica arvensis* L.) Yellowish, thin, minute. In clovers and fine grasses.
- p. **Rugel's Plantain** (*Plantago Rugelii* Dec.) Black, thin, dull, variable in form and size. In alfalfa, clovers, and grasses.
- q. **Buckhorn or Ribwort** (*Plantago lanceolata* L.) Amber colored or brown, often shining. In farm seeds generally.
- r. **Large-bracted Plantain** (*Plantago aristata* Michx.) Brown and gray, granular. In domestic alfalfa, clovers, and grasses.
- s. **Dwarf Plantain** (*Plantago Virginica* L.) Similar to q, smaller, lighter. In American-grown crimson clover.
- t. **Rough Buttonweed** (*Diodia teres* Walt.) Brown or gray, hairy. In Japan clover.
- u. **Cleavers** (*Galium Aparine* L.) Spherical, gray, rough from short light colored spines. In crimson clover, grasses, millets, and cereals.
- v. **Blue Field-madder** (*Sherardia arvensis* L.) Gray, the three frail teeth often wanting. In clovers and grasses.
- w. **Two Species of Wild Corn Salad** (1, *Valerianella morrisonii* DC. 2, *V. sp.*) Both kinds brown, fig. 2 often hairy. In clovers and grasses.
- x. **Chicory** (*Cichorium lufphus* L.) Brown, mottled, or straw-colored. In alfalfa, clovers, and grasses.

PLATE VII.

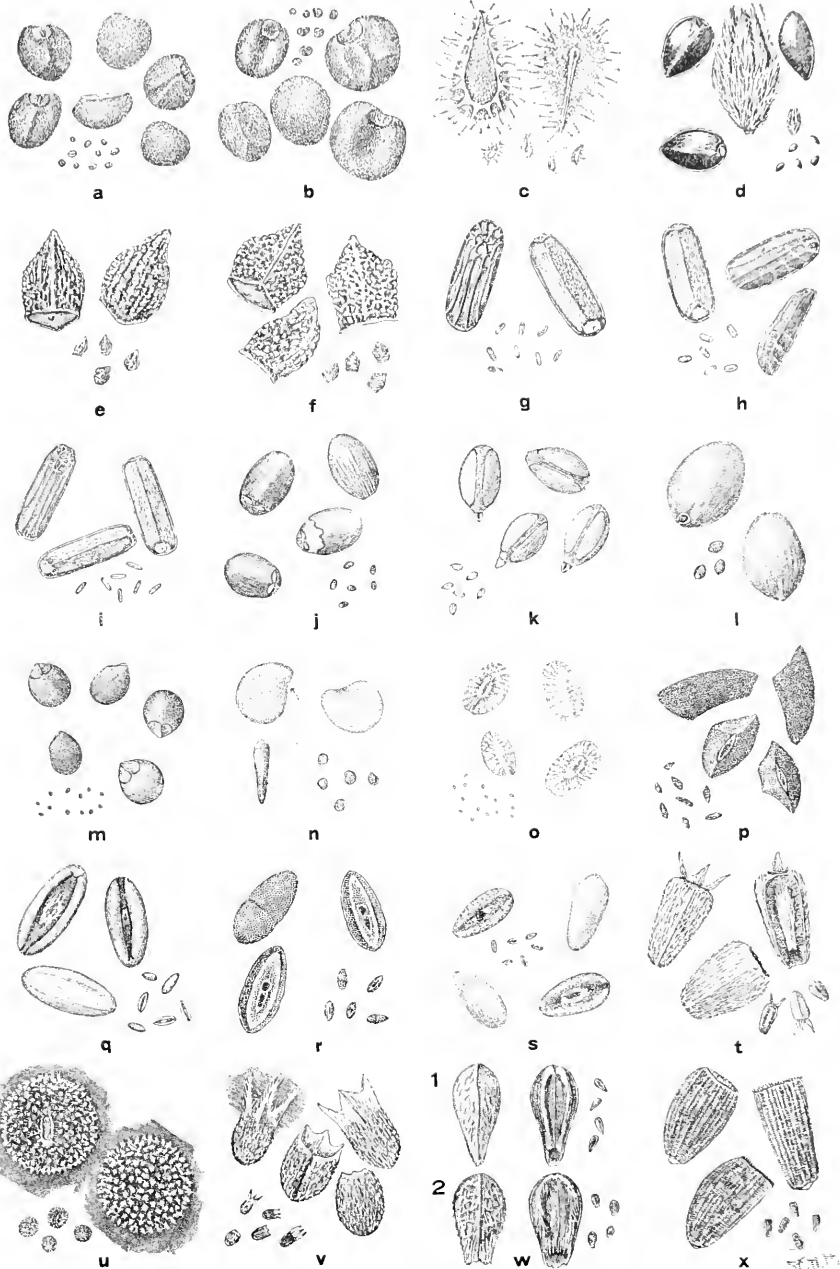


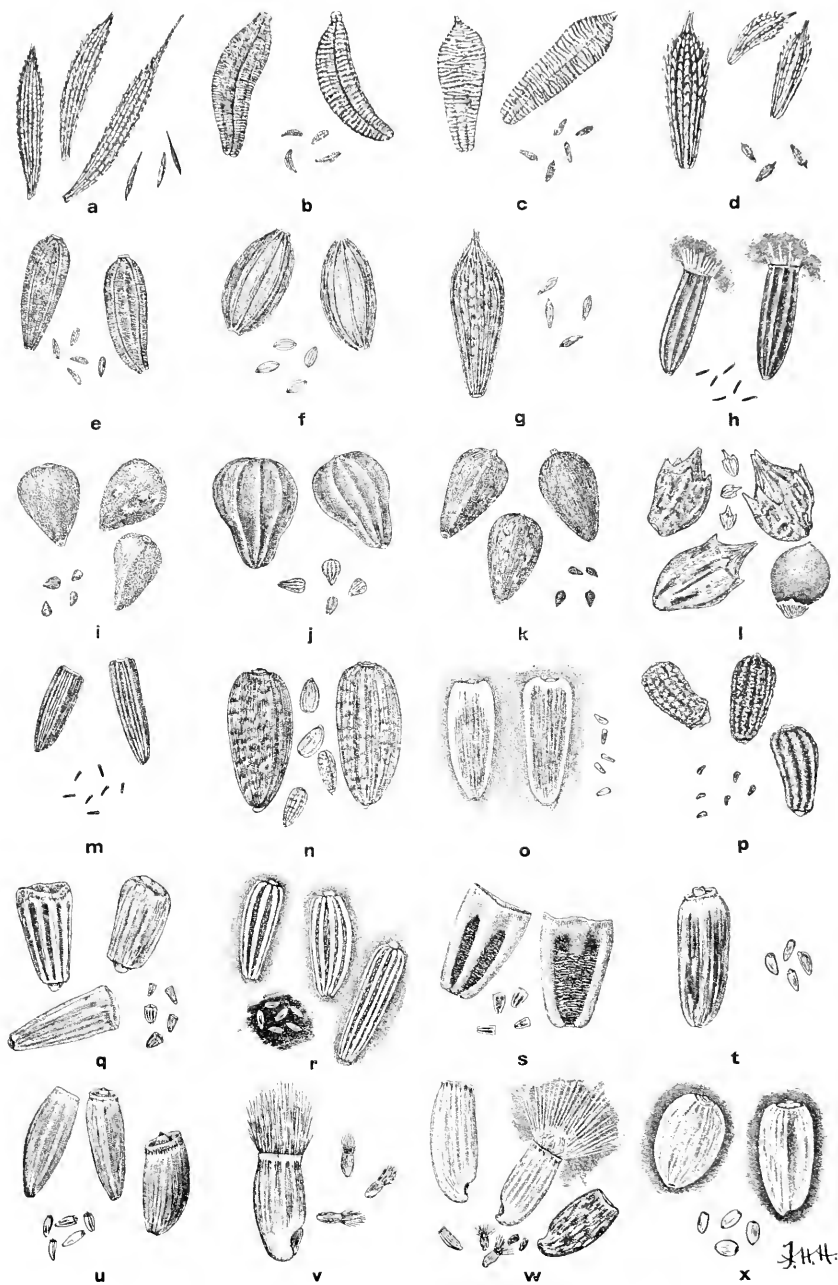
PLATE VIII.

Showing seeds natural size and enlarged.

- a. **Cat's-ear** (*Hypochaeris radicata* L.) Dark red. In clovers and coarse grasses.
- b. **Hawkweed** (*Picris hieracioides* L.) Reddish brown. In alfalfa, clovers, and grasses.
- c. **Bristly Ox-tongue** (*Picris echioides* L.) Orange or reddish yellow. In alfalfa, clovers, and grasses.
- d. **Dandelion** (*Taraxacum Taraxacum* (L.) Karst.) Light brown. Chiefly in grasses.
- e. **Annual Sow-Thistle** (*Sonchus oleraceus* L.) Light brown. In clovers and grasses.
- f. **Spiny Sow-Thistle** (*Sonchus asper* (L.) All.) Brown, thin. In grasses.
- g. **Prickly Lettuce** (*Lactuca Scariola* L.) Brown or gray, mottled. In grasses.
- h. **Orange Hawkweed** (*Hieracium aurantiacum* L.) Black, grooved, with white bristles. In grasses.
- i. **Small-flowered Marsh Elder** (*Ira axillaris* Pursh.) Gray or brown. In domestic alfalfa.
- j. **Rough Marsh Elder** (*Ira ciliata* Willd.) Black. In alfalfa, Japan and other clovers.
- k. **Burweed Marsh Elder** (*Ira xanthiifolia* (Fresen.) Nutt.) Black or gray. In domestic alfalfa.
- l. **Ragweed** (*Ambrosia artemisiacifolia* L.) Outer covering gray or brown, inner seed hull brown, smooth. In alfalfa, clovers, grasses, and cereals.
- m. **Black-eyed Susan** (*Rudbeckia hirta* L.) Black or gray. In clovers and timothy.
- n. **Common Sunflower** (*Helianthus annuus* L.) Gray or brown, mottled, often striped. In domestic alfalfa and cereals.
- o. **Yarrow** (*Achillea Millefolium* L.) White or gray, thin. In clovers and grasses.
- p. **Mayweed** (*Anthemis Cotula* L.) Light to dark brown, rough or smooth. In farm seeds generally.
- q. **Field Camomile** (*Anthemis arvensis* L.) Light brown, variable in size and form. In clovers, grasses, and cereals.
- r. **Ox-eye Daisy** (*Chrysanthemum Leucanthemum* L.) Gray, ridges white, black between. In clovers and grasses.
- s. **Scentless Camomile** (*Matricaria inodora* L.) Brown, the wrinkled spaces between the ribs black. In alfalfa, clovers, and grasses.
- t. **Spear Thistle** (*Carduus lanceolatus* L.) Straw-colored or pinkish striped with brown. In alfalfa, clovers, and grasses.
- †u. **Canada Thistle** (*Carduus arvensis* (L.) Robs.) Light brown. In red and alsike clovers, and grasses.
- v. **Blue-bottle** (*Centaurea Cyanus* L.) Bluish gray with brush of reddish bristles. In clovers, grasses, and cereals.
- w. **Star Thistle** (*Centaurea solstitialis* L.) Straw-colored, with or without bristles, some brown, mottled. In European alfalfa and clovers.
- x. **Centaurea** (*Centaurea Picris* Pall.) White or yellowish, conspicuous. In Turkestan alfalfa.

† *Unlaurful seed.*

PLATE VIII.



AN ACT

TO PREVENT AND PUNISH THE SALE OR OFFERING FOR
SALE OF ADULTERATED, IMPURE OR MISBRANDED
AGRICULTURAL AND VEGETABLE SEED AND THOSE
LACKING VIABILITY.

[PUBLIC LAWS 1909, CHAPTER 924.]

AN ACT TO PREVENT AND PUNISH THE SALE OR OFFERING FOR
SALE OF ADULTERATED, IMPURE OR MISBRANDED AGRICULTU-
RAL AND VEGETABLE SEED AND THOSE LACKING VIABILITY.

The General Assembly of North Carolina do enact:

SECTION 1. That the term "agricultural seed," as used in this act, shall include the seeds of red clover, white clover, alsike clover, alfalfa, Kentucky blue-grass, timothy, brome grass, orchard grass, red-top, meadow fescue, oat grass, rye grass, and other grasses and forage plants, flax, rape, and cereals and any seed sold for planting. "Vegetable seed" shall include any seed sold to be used in growing vegetables of any kind.

SEC. 2. Every parcel, package or lot of agricultural seeds, as defined in section one, containing one pound or more, offered or exposed for sale in this State for use within the State shall have affixed thereto, in a conspicuous place on the outside thereof, distinctly printed in the English language, in legible type, a statement certifying:

First, the name of the seed.

Second, full name and address of seedsmen, importer, dealer or agent.

Third, a statement of the purity of the seed contained, specifying the kind and percentage of the impurities, as defined in sections six and seven of this act, if the said seeds are below the prescribed standards.

Fourth, locality where said seed was grown, when known.

SEC. 3. The Commissioner of Agriculture, in person or by deputy or inspector, is hereby authorized to take from any lot or package of seeds over one pound in weight a sample not exceeding four ounces in weight, said sample to be drawn or taken in the presence of the party or parties in interest, or their representatives, and it shall be taken from a parcel or lot of parcels which shall not be less than five per cent of the whole lot inspected, or said sample may be taken in the presence of two disinterested witnesses. Said sample so taken shall be forwarded to the Department of Agriculture for analysis and comparison, with the certified statements required by section two of this act. A duplicate of said sample shall, upon request, be furnished to the person offering or exposing said seeds for sale.

SEC. 4. Upon receipt of a fee of fifty cents the Department of Agriculture shall furnish the person with whom the duplicate sample was left a report of the examination of said seeds.

SEC. 5. No person shall sell, offer or expose for sale or distribution in this State, for the purpose of seeding, any of the agricultural seeds as defined in section one of this act, unless said seeds are free from seed or bulbs of wild onions, commonly known as wild onions, wild garlic, field garlic, crow garlic, wild leek, or genus *allium*, species *vinale* and *canadense*, or the following weeds: wild mustard or charlock (*Brassica arvensis* (L.) Kt.), quack grass (*Agropyron repens* (L.) Beauv.), Canada thistle (*Carduus arvensis* (L.) Robs.), wild oats (*Avena fatua* L.), clover and alfalfa dodder (*Cuscuta Epithymum* Murr.), corn cockle (*Agrostemma Githago* L.), cheat or chess (*Bromus secalinus* L.), dog fennel (*Eupatorium capillifolium* (Lam.) Small.), wild carrot (*Daucus Carota* L.).

SEC. 6. The seeds of the following weeds shall be considered as impurities in agricultural seeds sold, offered or exposed for sale within this State for the purpose of seeding: cheat or chess (*Bromus secalinus* L.), white cockle (*Lyc-h-nis alba* Mill.), night flowering catchfly (*Silene noctiflora* L.), curled dock (*Rumex crispus* L.), smooth dock (*Rumex altissimus* Wood), sheep sorrel (*Rumex acetosella* L.), yellow trefoil (*Medicago lupulina* L.), sweet clover (*Melilotus alba* Desr.) and (*M. officinalis* L.), black mustard (*Brassica nigra* (L.) Koch.), plantain, buckhorn (*Plantago lanceolata* L.), bracted plantain (*Plantago aristata* Michx.), bind weed (*Convolvulus sepium* L.), smooth crab-grass (*Digitalis humifusa* Pers.), common chickweed (*Stellaria media* (L.) Cyrill.). When such impurities or any of them are present in quantity exceeding in their combined weight a total of two per cent of the weight of said

agricultural seed, the approximate percentage of each shall be plainly indicated in the statement required by section two of this act.

SEC. 7. Sand, dirt, chaff, and foreign substances and seeds other than those specified in section eight and section nine, or broken seed and seed not capable of germinating, shall be considered impurities when present in agricultural seeds. When such impurities or any of them are present in quantity exceeding the standards of purity and viability authorized in section eleven of this act, the name and approximate percentage of each shall be plainly indicated in the statement specified in section two.

SEC. 8. For the purposes of this act, seeds shall be deemed to be mixed or adulterated:

First, when orchard grass (*Dactylis glomerata* L.) seed contain ten per cent or more of meadow fescue (*Festuca elatior* L.) seed or Italian rye grass seed (*Lolium italicum* A. Br.) or English rye grass (*Lolium perenne* L.) seed.

Second, when red clover (*Trifolium pratense* L.), mammoth red clover (*Trifolium pratense* L. var.) or alfalfa (*Medicago sativa* L.) contain five per cent or more by weight of yellow trefoil (*Medicago lupulina* L.) or sweet clover (*Melilotus alba* Desr. or *M. officinalis* (L.) Lam.) seed; or,

Third, when Kentucky blue-grass or blue-grass (*Poa pratensis* L.) seed contain five per cent or more by weight of Canada blue-grass (*Poa compressa* L.) seed, red-top (*Agrostis alba* L.) seed, red-top chaff or any other seed or foreign substance.

Fourth, when rape (*Brassica Napus* L.) contains five per cent or more of common mustard (*Brassica sinapistrum* Boiss.) or black mustard (*B. nigra* (L.) Koch.).

SEC. 9. *Misbranded seed.*—For the purposes of this act, seeds shall be deemed misbranded when meadow fescue (*Festuca elatior* L.), English rye-grass (*Lolium perenne* L.) or Italian rye-grass (*Lolium italicum* A. Br.) is labeled or sold under the name of orchard grass (*Dactylis glomerata* L.) seed.

Second, when Canadian blue-grass (*Poa compressa* L.) seed, red-top (*Agrostis alba* L.) seed or any other seed not blue-grass seed is sold under the name of Kentucky blue-grass or blue-grass (*Poa pratensis* L.) seed.

Third, when yellow trefoil (*Medicago lupulina* L.), burr clover (*Medicago hispida* Gaertn.) or sweet clover (*Melilotus alba* Desr.) is sold under the name of clover, June clover, red clover (*Trifolium pratense* L.), medium red clover, small red clover, mammoth red clover, sapling clover, peavine clover (*T. pratense* L. var.) or alfalfa (*Medicago sativa* L.) seed.

Fourth, when the seed are not true to the name under which they are sold.

SEC. 10. Provisions concerning agricultural seeds contained in this act shall not apply to:

First, any person or persons growing or selling seed for food purposes only, or having such seed in possession for sale for such purposes.

Second, any person selling direct to merchants, to be cleaned or graded before being offered for sale for the purpose of seeding. This shall not, however, exempt the seller from the restrictions of section four of this act.

Third, seed that is held in storage for the purpose of being recleaned and which has not been offered or exposed or held in possession for sale for the purpose of seeding.

Fourth, seed marked "Not absolutely clean" and held or sold for export outside of the State only.

Fifth, the sale of seed that is grown, sold and delivered for any farmer on his own premises for seeding by the purchaser himself, unless the purchaser of said seed obtains from the seller at the time of the sale thereof a certificate that the seed is supplied to the purchaser subject to the provisions of this act.

Sixth, mixtures of seeds for lawn-grass purposes, but this shall not exempt the seller of such mixtures of seeds from the restrictions of sections four and seven of this act.

SEC. 11. *Standards of purity.*—The following standards of purity, meaning freedom from weed seeds and other foreign seeds, and viability, are hereby fixed:

Name of Seed	Per Cent of Purity.	Per Cent of Viable Seed.
Alfalfa	96	80
Barley	98	90
Blue-grass, Canada	90	15
Blue-grass, Kentucky.....	80	45
Brome, awnless	90	75
Clover, alsike	96	75
Buckwheat	96	90
Clover, crimson	98	85
Clover, red	92	80
Clover, white	90	75
Corn, field	99	91
Corn, sweet	99	75
Fescue, meadow	95	85
Flax	96	89
Millet, pearl	99	65
Millet, common	90	85
Millet, hog	90	85
Oats	98	90
Oat Grass, fall.....	72	70
Orchard Grass	70	70
Rape	99	90
Red-top	90	70
Rye	98	90
Rye-grass, perennial	96	90
Rye-grass, Italian	95	80
Sorghum	96	80
Sorghum for fodder.....	90	60
Timothy	96	85
Wheat	98	90

SEC. 12. The execution and enforcement of this act is hereby committed to the Board of Agriculture, who are authorized to appoint inspectors and make regulations for that purpose, which regulations shall have the force of law as provided for the execution of the laws relating to quarantine inspection, pure food, crop pests, stock feeds, and other matters committed to the direction of the board. Any violation of any such regulation shall be a misdemeanor, punishable upon conviction by fine or imprisonment, in the discretion of the court.

SEC. 13. Any person selling or exposing for sale any of the seeds specified in sections eight and nine of this act which are mixed, adulterated or misbranded, or any agricultural seeds which do not comply with sections five, six, and seven, and any person who shall prevent or attempt to prevent any inspector or other employee or agent of the Department of Agriculture in the discharge of his duties or violate any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction shall be fined not more than one hundred dollars or imprisoned at the discretion of the court: *Provided*, that no one shall be convicted of violation under the provisions of section five if he shall prove that the weed seeds named therein are present in quantities of not more than one in ten thousand and that due diligence has been used to find and remove said seed.

SEC. 14. All seedsmen and others who sell farm or garden seeds to be used in producing crops for sale or for family use shall be bound as guarantors that such seeds are true to kind and name, as represented at the time of sale, whether said seeds were raised by the seller or by another; and if such seeds are sold by an agent, the principal shall be bound by the representations of said agent in regard to the kind and name of the seed so sold. If any paper or package containing seed sold in this State for planting or seedling has printed or written thereon the name, kind or quality of the seeds therein, the seller shall be bound in the courts of this State by the same written or printed statement, unless it be affirmatively proven that there was some other agreement between the parties in respect thereto.

SEC. 15. Any citizen of the State may send to the Department of Agriculture samples of seeds they have purchased or may wish to have examined with a view of purchasing, for examination and analysis. The Department of Agriculture shall have examination and analysis made according to the provisions of this act and send copy of such analysis to the party sending the seed.

SEC. 16. Persons or firms desiring to sell or offer for sale seeds in this State shall have like privileges as to their goods upon payment of a fee of fifty cents for each sample.

SEC. 17. For the purpose of providing a fund to defray the expenses of the examination and analysis prescribed in this act, each person, firm or corporation selling or offering for sale in or for export from this State any seed as mentioned in this act shall register with the Department of Agriculture the name of the person, firm, or corporation offering the seed for sale, and shall pay a license tax annually of twenty-five dollars, the same to be paid in July, one thousand nine hundred and nine, and January, one thousand nine hundred and ten, and annually thereafter. The commissioner's receipt for such money shall be license to conduct the business, and the agents or sellers of said person, firm or corporation paying such tax shall not be required to pay any further tax under this act.

SEC. 18. The Commissioner of Agriculture shall pay all money received from such license, together with all fees as prescribed in section sixteen of this act, into the Treasury of the State, to be credited to the funds of the Department of Agriculture, and it shall be drawn out upon warrant of the commissioner, as required by law for other funds.

SEC. 19. Any person, firm, or corporation selling or attempting to sell in this State without procuring the prescribed license, or any person, firm, or corporation violating any other provision of this act shall be guilty of a misdemeanor, and upon conviction shall be fined or imprisoned, in the discretion of the court.

SEC. 20. This law shall be in force from and after July first, one thousand nine hundred and nine.

Ratified this the 9th day of March, A. D. 1909.

PURE SEED REGULATIONS.

The Board of Agriculture has adopted the following regulations by authority of this law:

REGULATIONS.

1. The Commissioner shall prepare licenses as required by the act, and have samples collected for analysis and inspection.

2. The agents or sellers of any person, firm, or corporation paying such tax shall not be required to pay any further tax under this act.

3. SEC. 11. "If it shall be stated on the package that the guarantee is as to kind, but not as to variety, it will not be a violation. But beets cannot be labeled 'Turnips,' nor watermelons 'Cantaloupes.' There are too many different standards as to particular types of vegetables to have a uniform rule."

4. No prosecution for failure to comply with standard of viability, as stated in section 11, will be asked, provided the package in which the seed are contained is marked to show this; but it must have a reasonable per cent of germinating power.

5. Mixtures of pasture and meadow-hay grass are included in the provisions of subsection 6, section 10.

The Commissioner and chairman of committee on pure seeds shall have authority to suspend any regulation when in their judgment this is necessary.

W. A. GRAHAM,
Commissioner.

June 5, 1909.

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WHEAT AND OATS

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*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Plant Industry, United States Department of Agriculture.

LETTER OF TRANSMITTAL

Sir—I submit herewith a manuscript discussing various phases of the production of wheat and oats in North Carolina together with the results of our variety work on the test farms during the past season. It is our plan to revise and embody in this bulletin, each year, not only the results of the work done in North Carolina but to include the latest and most approved methods of wheat and oat culture, in brief outline, that have been developed in other parts of the United States. This bulletin should thus relieve wheat growers of a great deal of useless reading trying to get at the leading facts concerning the growth of these crops. The details of the variety work were carried out very efficiently on the test Farms by Messrs. Meacham and Collett and much credit is due them for the results achieved. I recommend that this manuscript be published as a supplement to the September bulletin of this Department.

Very respectfully,

J. L. BURGESS,
Agronomist.

To HON. W. A. GRAHAM,
Commissioner of Agriculture.

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WHEAT AND OATS

INTRODUCTION

The object of this bulletin is not only to report the progress of the work done in testing different varieties of wheat and oats but also to call attention to, and stimulate a greater interest in, the possibilities along the line of cereal production that lie within easy reach of the farmers in many parts of the State. We hope the day is not far distant when we shall be able to sell wheat and oats rather than buy them for home consumption.

Every farmer knows that all of our soils are not equally well suited to wheat production; that we have some soils on which wheat culture should not be attempted. But there are some areas of soils in the coastal plain, Piedmont and mountainous sections of the State on which wheat culture may be carried on with profit. The Piedmont has a larger area adapted to wheat than the other sections of the State, but, since farming, in the last analysis, is a business in which the different departments must stand or fall on an economic basis, we can not encourage the growth of wheat in one section and discourage it in another, because it is always wise to grow the crop that PAYS BEST; and while some soils are much better suited to the production of wheat and oats than are others, there are conditions under which it may pay the farmer better to grow these cereals on the soils that lend themselves less kindly to the production of this than to the production of some other crop.

HISTORICAL NOTE ON WHEAT

Wheat is one of our oldest known cereals. It was a field crop with the Greeks and Egyptians. A small-grained variety was grown in Switzerland as early as the Stone Age and in China its cultivation was common in 2700 B. C. The domestication of this plant is much older than the history of man, as is evidenced by its presence in many ancient monuments that antedate the Hebrew Scriptures.

The original habitat of wheat is not certainly known, but is thought to be the valley of the Euphrates in Western Asia.

Its ease of cultivation, nutritive value and ease of preparation for food, its almost exclusive possession of the elements necessary to make a light, porous bread, and its ability to adapt itself to widely different soil and climatic conditions has made it one of the principal foods of man. While the wheat crop has long been important in countries occupied by civilized people, its use is becoming more and more pronounced as civilization advances. Indeed, wheat is the principal edible cereal of most civilized countries.

Wheat, unlike the potato, corn and tobacco, is a naturalized plant in America, its cultivation having been commenced here some time after Columbus reached our shores.

Prior to 1880, wheat was grown pretty generally over North Carolina, but since that time the production has been largely restricted to the Piedmont and mountainous sections of the State.

A number of factors have operated in curtailing the production of wheat in the Coastal Plain Region, not least among these being a general absence of soils suited to wheat culture and a lack of sufficient water power to operate the primitive burr mills used in its manufacture into flour. The farmers of the section were also, doubtless, influenced against wheat growing by the better adaptation of their soils to and the promise of greater rewards from the growing of cotton, peanuts, light tobacco, and early truck crops.

STATISTICS

The annual supply of wheat to the world today is something over three billion bushels, of which the United States produces about one-fourth. For years no systematic records were kept of the yield of wheat in this country. In 1850 the Census Report showed the wheat production of the United States to be about 100,000,000 bushels. From this amount the yield grew to our maximum production of over 748,000,000 bushels in 1901. In 1907 the average yield of wheat per acre in the United States was 14 bushels. The same year the average acre yield for North Carolina was 9.5 bushels.

Strange as it may appear, the price of wheat in the United States in 1850, when we grew but 100,000,000 bushels, was lower than it is today, when we grow over 700,000,000 bushels. This shows that while the supply has increased over 600 per cent. the demand has undergone an even more pronounced change.

In 1900 North Carolina produced 5,960,803 bushels of wheat worth 82 cents a bushel, representing a money value to the State of \$4,887,858. In 1907 we produced but 5,320,000 bushels, but the price advanced to \$1.07 a bushel, thus giving the crop a money value of \$5,692,000, an increase of \$804,142 over the larger but lower-priced crop of 1900. In 1910 the average acre yield in North Carolina was 11.4 bushels. The price ranged from \$1.10 to \$1.30 with a general average of about \$1.20 a bushel. The total yield in the State was 7,433,000 bushels. It thus appears that we not only had the largest acre yield, and received the best price per bushel, but also the largest total yield in the history of the State. The year 1910 was a great wheat year for North Carolina.

In view of the rapidly increasing price of wheat and the thousands of acres of land in the State well suited to the production of this crop on a profitable scale, the State Department of Agriculture deems it wise to foster and encourage the growth of this crop among our farmers.

When we remember that the great wheat region of the Northwest, where good crops may be grown without irrigation, is nearly all occupied, and that these virgin soils lose their crop-producing power rapidly after five or six years of continuous wheat culture, the present high price of wheat in our midst should carry a definite meaning to North Carolina wheat growers. Why should not the farmers of the

State make wheat growing a profitable branch of their farm economy? Everything seems to be in their favor. The wheat growers of the West must harvest their crop and let their land lie idle till the next season. One crop per year is all they may hope to get. But in our State many of the growers can follow their wheat with either a crop of cowpeas for seed or hay or green manure, or they may sometimes put corn on the newly broken stubble. This latter practice is rarely advisable, however, except where heavy fertilization is practiced. It is quite feasible and generally advisable, however, to have a crop of either cowpeas or soy beans follow the wheat crop to be plowed under as green manure and thus leave the land in better condition for the growth of succeeding crops.

CULTIVATION

The farmers in the Piedmont and mountainous sections are familiar with the ordinary methods of wheat culture as practiced in the State. Usually, the crop follows wheat or peas which have grown on a wheat or other small-grain stubble, or is sown on corn stubble after the crop has been removed. In the eastern part of the State cotton is sometimes all picked out in time to allow wheat to follow this crop. More generally wheat follows corn. Where level cultivation of the corn has been practiced, and where the land was well prepared for the corn crop, the wheat may be put in with a drill after the corn has been removed, by giving the land a thorough disking beforehand, going over it a sufficient number of times to make a good seed bed two to four inches deep. Many farmers, however, prefer to give the land a light plowing before putting in the crop, even where corn has been grown. This latter practice is likely the best where there is much weeds and grass on the land, which should be cut with a disc harrow two or more times before plowing; but the plowing should be shallow. The disc harrow should be run over the land after it is plowed so as to further fine the surface, cut up the vegetation, and aid it in settling and becoming compact. If land is still somewhat loose a heavy roller should be run over the surface just before seeding. This will still further compact the subsurface and lift the moisture into the upper stratum of soil where the wheat plants can utilize it. When we recall that every pound of dry matter in wheat requires over 300 pounds of water for its production, the necessity for so preparing the land that the greatest amount of moisture may be rendered available to the plant will become apparent. With a view to the conservation of moisture, the land intended for corn which precedes a crop of wheat should be well and deeply broken in the fall or winter and thoroughly disked in the spring before planting the corn. Where possible, a crop of green manure for soil improvement should occupy the land during the winter and be turned under in the spring to precede the crop of corn. Where practicable, the cultivation of the corn should be level, as this is best, as a rule, for corn, and leaves the land in the best shape for preparation for wheat or other small grain.

Where wheat is to follow peas, wheat, or other crops, the same principle as to seedbed should be kept fairly in mind. Not infrequently

wheat follows wheat or other small grain where weeds and grass have grown to a greater or less height during the interval between the harvest of the previous crop and seeding time. Where this growth is considerable it is the best practice to cut it a number of times with a sharp disk harrow, then plow it under shallow and disk once more with the disk set at a slight angle. Where the growth of weeds and grass is not very large, they may be turned under and disked once or twice after plowing, but in both cases the plowing should be done at least a month before seeding time, so as to allow the ground to settle. Disk and smoothing harrows should be used liberally in cutting up the soil to aid it in settling and becoming firm. A heavy roller may be run over the freshly plowed land soon after breaking to break the clods and lumps and compact the soil. It is well to follow the roller with a smoothing harrow, especially if seeding time is near at hand, so as to form a mulch to prevent the evaporation of water.

On account of our dry falls, the wheat should be put in rather deeply, and the drill rows left open or undragged, in order to prevent winter killing by the heaving of the soil and be a protection from cold winds. One bushel is a fair seeding, though some use as much as one and one-half bushels with good results. The seed should be put in sufficiently early to allow the plants to attain sufficient size and hold on the soil before cold weather comes, to reduce, as far as possible, the bad effects of freezing and soil heaving. The best time will vary in different sections and in different seasons. Where the Hessian fly is troublesome it is likely best to delay seeding until after a good frost, but where it is not troublesome seeding may be made prior to this time to good advantage.

In the great wheat region of the Northwest the crop is sometimes harrowed with a light harrow or weeder in the spring for the conservation of moisture, but in the East the cultivation is generally all given before the crop is put on the land. This makes it all the more important to thoroughly prepare the land before the crop is put in. Some have used a light smoothing harrow and weeder in the spring to good advantage and we believe it is good practice to employ these implements, especially when the season is dry.

FERTILIZATION

The best fertilization of wheat and other small grain will depend on the character of the soil, its condition, the crops which have preceded and the fertilization which has been given them. Wheat can be grown to best advantage and most profitably in rotation with other crops where one or more of the legumes or nitrogen-gathering plants have occupied prominent places. These gather from the air and store in the soil a large amount of the nitrogen so necessary for the development of small grain. In the mountain district and on the red clay and valley lands of the Piedmont the following rotations are well suited:

First year—Wheat with red clover sown in the spring on the fall-sown wheat.

Second year—Red clover, with the second crop turned under after maturity of seed for soil improvement and for storing seed in the soil.

Third year—Corn.

This gives a three-year rotation, with corn following clover and wheat corn, which fit into each other nicely. In the Piedmont and Eastern sections of the State a shorter rotation of wheat, followed by peas to be cut for hay or left on the ground and turned under for soil improvement in the fall or winter for the first year, and corn the second year, to be followed again by wheat or other small grain, gives an excellent two-year rotation, which, with proper fertilization, would improve the soil and the crop yields at the same time. Cotton may be added to this rotation where the land is suitable, allowing the cotton to follow wheat and peas the second year. Crimson clover may be put in the cotton at last cultivation, or after first picking, and turned under the third year in time for corn.

Examinations of the upland and valley soils of the mountain district and of the red clay and valley soils of the Piedmont show them to be high in potash and poor in phosphoric acid, the amount of nitrogen, or ammonia, in all of them depending on the amount of organic matter, or humus, present. A fertilizer for best results on these soils should contain but small amounts of potash and large amounts of phosphoric acid, the amount of nitrogen, or ammonia, depending on the organic matter present in them, and the size of the stalk which the land will produce naturally without fertilizer; the main office of the nitrogen being to produce stalk, without a satisfactory growth of which a good crop of grain can not be obtained. Phosphoric acid and potash, and especially phosphoric acid, are needed to cause the small grain heads to fill properly.

A good application of fertilizer for wheat is 300 to 600 pounds per acre. Where the land has been well prepared and is in good condition, it will pay to fertilize liberally. As a rule, the fertilizer should be applied in the fall at time of seeding. Good results will be obtained from the use of one-half the nitrogen in the fall along with the phosphoric acid and potash, and the other half as a top dressing in the spring after growth has well started from nitrate of soda or sulphate of ammonia. Where wheat or other small grain has been grown in one of the rotations suggested above or similar ones with soil-improving crops, one-half the nitrogen in the mixtures may be omitted after the rotation has been repeated one or more times, and may be left out altogether after sufficient organic matter, or humus, has been stored in the soil to produce a sufficiently large development of stalk for a good crop of grain. In this case a top dressing of 75 to 100 pounds per acre of nitrate of soda may be given just about the time the plants begin to joint in the spring if the crop is not found growing off nicely.

ADAPTATION

We generally think of wheat as a plant suited to cold climates. The great bulk of the crop is grown where the winters are very cold and where the summer heat is seldom excessive. The most noted exceptions are the wheatfields of California, Egypt, and India.

The wheat industry is gradually spreading northward in this country, first as a spring, then as a fall-sown crop. Spring wheat once grew over Kansas, Nebraska, and Iowa, where winter wheat is now grown almost altogether. In the Dakotas and Minnesota spring wheat was grown exclusively till a short while ago, when here and there fall-sown wheat began to appear. Wheat soon adapts itself to untoward climatic conditions. By careful manipulation spring wheat may be changed to winter wheat in a short time. In one instance only three years were required to change the one to the other.

In its adaptation to different soils the process seems to be somewhat slower. Wheat, being one of the grasses, requires a rather close, heavy soil for the best development of its fibrous root system, and this condition is met with only in a loam, silt loam, clay loam or a clay soil. There is no variety of wheat that does well in a light sandy soil in the Eastern part of the United States and in the West, while the durum wheats do better on the light soils than the other varieties, they make their best yields on the heavier silty loams.

The soils in North Carolina that produce our best wheat are found in the Piedmont and mountainous sections of the State. These soils are known as the Cecil or red clay, the Cecil loam and the Porters loam, the last-named soil being confined to the mountains. All of them are characterized by a red to reddish brown soil containing varying amounts of sharp sand, silt and clay, impregnated with iron oxide. These are all residual soils, derived from the breaking down of the granites, crystalline schists, mica shists, and the more basic rocks found in the western part of the State. The soils thus derived contain, as a rule, an abundance of mineral plant food, but in a form in which the plants can not use it, and must be rendered available by cultivation, manuring and proper fertilization. A stiff red-clay loam underlies all of these soils.

COMPOSITION

The following tables show the composition of the wheat grain, by-products and the feeding value of wheat straw:

TABLE I.—SHOWING COMPOSITION OF WHEAT GRAIN AND PATENT, BAKERS' AND LOW-GRADE FLOURS.

	Grain	Patent Flour	Bakers' Flour	Low-Grade Flour
Water.....	10.5	11.48	12.18	12.01
Ash.....	1.8	.39	.62	1.99
Protein (Nx6.25).....	11.8	12.95	14.88	17.95
Crude Fiber.....	1.8	.18	.33	.93
Nitrogen-free extract.....	72.0	73.55	69.99	63.26
Fat.....	2.1	1.45	2.00	3.86
Phosphoric acid.....	.82	.18	.31	1.16

TABLE II.—SHOWING COMPOSITION OF BY-PRODUCTS OF WHEAT.

	Bran	Shorts	Middlings
Water.....	11.9	11.8	12.1
Ash.....	5.8	4.6	3.3
Protein (Nx6.25).....	15.4	14.9	15.6
Crude fiber.....	9.0	7.4	4.6
Nitrogen-free extract.....	53.9	56.8	60.4
Fat.....	4.0	4.5	4.0

TABLE III.—SHOWING PERCENTAGE COMPOSITION AND FEEDING VALUE OF WHEAT STRAW.

	Percentage Composition	Per Cent Digestible
Water.....	9.6	
Ash.....	4.2	
Protein (Nx6.25).....	3.5	11
Crude fiber.....	38.1	52
Nitrogen-free extract.....	43.4	38
Ether extract.....	1.3	31

It will be noted that the wheat grain is quite high in protein, fat, and nitrogen-free extract, and thus highly nutritious, while the feeding value of straw is quite low. These tables show the composition of the ripened grain and straw only and reveal to us that at maturity most of the nutritive value of the plant is collected in the grain, thus rendering the straw of little value as forage. The tables also show that of the nutrients left in the straw only a small percentage of them is digestible.

ENEMIES OF THE WHEAT CROP

The Hessian fly is perhaps the most serious insect pest that attacks wheat in this State. To offset its ravages it has been found advisable to sow the crop a little late and after the first frost. There seems to be no known practicable remedy for the prevention of rust, except that of developing rust resistant varieties. Smut may be largely prevented by treatment of the seed before sowing with a solution of formalin. This is done by immersing the seed for thirty minutes in a solution made of mixing one pound, or one pint, of formalin to fifty gallons of water. Before treating with the formalin immerse the seed in cold water and skim off any smut balls that may rise to the surface. After immersion in the formalin solution, spread out the seed and allow them to dry thoroughly before sowing.

The insect enemies of stored wheat and oats may be destroyed by the use of carbon bisulphide at the rate of 1 pound of carbon bisulphide to 2,000 pounds of grain or 1,000 cubic feet of space. Put the grain in a tight box and place the insecticide in an open vessel on the grain or near it and cover the box carefully. The fumes will go down among

the grain and destroy all animal life with which it comes in contact. This treatment should be repeated as often as the insects begin to reappear. All wheat and other small grain should be treated for smut before sowing.

VARIETY TESTS OF WHEAT

There are, perhaps, over two hundred varieties of wheat in the United States today. In the case of live stock, each breed or strain is developed to meet some special demands; so, also, in plants, in general, a variety is the result of a definite set of environmental conditions that have combined to produce the variations that go to make the new strain. The variety then, is the result either of changed natural conditions or of effort along lines carefully laid with a view to adapt and adjust strains of plants to new environmental conditions. The variety thus developed is, in the nature of the case, adapted to the surroundings where it has been making its best yields.

In the case of wheat the mere existence of wheat varieties carries with it the suggestion that they are not all equally well suited to all climatic and soil conditions, and that each one has, doubtless, proven to be the best variety tested in its native locality. We are to assume, then, that these are all good wheat when grown under favorable soil and climatic conditions. Again, since varieties of plants are generally developed in a given locality under given soil and climatic conditions, it follows that they will make as good, if not better, yields when propagated under soil and climatic conditions similar to those under which they have been developed. Now if there be a probability that varieties of wheat will make better yields in their native environments than elsewhere, it follows that the adaptability of the many different varieties put on the market should be tested. If any of them are well suited to the climate and soils of our State it is worth our while to know it. Should they not be adapted to our conditions, such knowledge is a necessary protection against loss. The only way to gain this knowledge is to subject these wheats to a rigid test on our soils. The recommendations of the seedsmen are, generally, not to be relied upon, since they never know whether the environment in which the variety has been developed is similar to the one in which we will be forced to grow it.

With a view to protect the farmer against the frauds of unscrupulous seedsmen and originators on the one hand, and to ascertain the varieties best suited to the soils of the State on the other, the State Department of Agriculture began, in 1900, to collect wheat varieties from different parts of the world and to subject them to a rigid test on the recognized wheat soils of the State. Since then over thirty different varieties have been collected and tested—some for longer, others for shorter periods.

The reader will bear in mind that in any given year all of the varieties tested were subjected to identical soil and climatic conditions at the different farms and received identical treatment as to the fertilization and previous preparation of land.

COMMENTS ON VARIETY TESTS OF WHEAT

Most of the tests of wheat varieties have been made at the Iredell farm, where the soils seems better adapted to wheat culture and not so well suited to the growth of such crops as make their best development in the Coastal Plain Region. The soils on this farm belong to the Cecil series and range in texture from a loam to a clay loam. The depth of these soils runs from six to eight inches. They are reddish-brown in color, well drained and fairly retentive of moisture. Wherever found, these soils are well suited to the growth of general crops, such as corn, wheat and oats, except in so far as climatic conditions may oppose.

On the following pages are recorded results of the variety tests of wheat at the Iredell and Buncombe Test Farms in 1911 and a discussion of the compiled results on the Iredell station during 1907, 1908, 1910, and 1911.

Laneaster, a bearded wheat, made the highest yield this year at the Iredell farm followed closely by Acme and Dietz Mediterranean. A number of the varieties made good yields at this station this year. Out of the seven tested, eleven yielded as high as twenty and one as high as twenty-three bushels to the acre. The lowest yielders were Red May, Klondyke, and Australian Red in the order given.

In Table No. V are given the results of the variety tests of wheat at the Buncombe farm for 1911. On the soils of this farm Leap's Prolife made the best yield per acre. It will be of interest to note that this wheat was grown on this farm in 1910 as was also the second and third best yielders, Miller's Choice and Dietz Mediterranean.

In Table No. VI are the compiled results of the variety work at the Iredell farm during the last four years with the exception of 1909. During this time Golden Chaff made the highest average yield per acre while Red Wonder made the second best average. Only five varieties have been tested throughout this period, namely: Golden Chaff, Red Wonder, Purple Straw, and Leap's Prolife.

TABLE IV.—WHEAT VARIETY TEST, HREDELL TEST FARM, 1911.

Variety.	Date of Sowing.	Date of Ripening.	Date of Harvest.	B—Bearded. S—Smooth.	Yield Per Acre in Bushels of 60 lbs. each.	Pounds Straw Per Acre.	Per Cent of Grain.	Per Cent of Straw.	Rank According to Yield Per Acre.
Lancaster.....	11-9	6-9	6-15	B	23.	2,230	38.	62.	1
Acme.....	11-9	6-10	6-15	B	22.33	1,860	41.8	58.2	2
Dietz Mediterranean.....	11-9	6-9	6-15	B	22.17	2,070	38.1	61.9	3
R. A. Shoaf's.....	11-9	6-9	6-15	B	21.83	1,805	41.7	58.3	4
Young's.....	11-9	6-10	6-15	B	21.66	1,910	40.3	59.7	5
J. S. Carr's.....	11-9	6-8	6-15	S	21.17	1,630	43.7	56.3	6
Leap's Prolific.....	11-9	6-6	6-15	S	20.33	1,580	46.9	53.1	7
Golden Chaff.....	11-9	6-5	6-15	S	20.33	1,480	44.4	55.6	7
Miller's Choice.....	11-9	6-10	6-15	B	20.33	1,880	39.3	60.7	7
Fultz.....	11-9	6-6	6-15	S	20.	1,185	43.8	56.2	8
Fuleaster.....	11-9	6-9	6-15	B	20.	1,720	40.6	59.4	8
Purple Straw.....	11-9	6-8	5-15	S	18.66	1,480	43.	57.	9
Red Wonder.....	11-9	6-10	6-15	B	18.33	1,390	44.4	55.6	10
Bearded Fuleaster.....	11-9	6-10	6-15	B	18.33	1,630	39.6	60.4	10
Australian Red.....	11-9	6-10	6-15	B	18.	1,140	48.1	51.9	11
Klondyke.....	11-9	6-10	6-15	S	15.50	1,320	42.6	57.4	12
Red May.....	11-9	6-6	6-15	S	14.33	1,540	35.8	64.2	13

TABLE V.—WHEAT VARIETY TEST, BUNCOMBE TEST FARM, 1911.

Variety.	Date of Sowing.	Date of Heading.	Date of Harvest.	B—Bearded. S—Smooth.	Yield Per Acre in Bushels of 60 lbs. each.	Pounds of Straw Per Acre.	Per Cent of Grain.	Per Cent of Straw.	Rank According to Yield Per Acre.
Leaps Prolific (Native).....	11-10	.....	6-28	S	23.33	1,740	44.5	55.5	1
Miller's Choice (Native).....	11-10	.....	6-28	B	20.66	1,780	41.	59.	2
Deitz Mediterranean (Native).....	11-10	.....	6-28	B	20.00	1,640	42.2	57.8	3
Lancaster.....	11-10	.....	6-28	B	19.5	1,720	40.2	59.8	4
XX (Native).....	11-10	.....	6-28	.....	19.33	1,600	42.	58.	5
No. 14 (Native).....	11-10	.....	6-28	.....	19.33	1,740	40.	60.	5
No. 15 (Native).....	11-10	.....	6-28	.....	19.00	1,740	39.5	60.5	6
J. S. Carr's.....	11-10	.....	6-28	B	19.00	1,580	42.5	57.5	6
No. 16 (Native).....	11-10	.....	6-28	.....	18.66	1,640	40.5	59.5	7
R. A. Shoaf's.....	11-10	.....	6-28	B	18.33	1,260	40.2	59.8	8
Fuleaster.....	11-10	.....	6-28	B	18.00	1,880	36.4	63.6	9
Golden Chaff.....	11-10	.....	6-28	S	18.00	1,640	39.7	60.3	9
Leap's Prolific.....	11-10	.....	6-28	S	17.66	1,460	42.	58.	10
No. 13 (Native).....	11-10	.....	6-28	.....	17.33	1,520	40.6	59.4	11
Dietz Mediterranean.....	11-10	.....	6-28	B	17.00	1,480	40.8	59.2	12
Lancaster (Native).....	11-10	.....	6-28	B	16.66	1,500	40.	60.	13
Red May.....	11-10	.....	6-28	S	16.66	1,500	40.	60.	13
Klondyke.....	11-10	.....	6-28	S	15.66	960	49.4	50.6	14
Fultz.....	11-10	.....	6-28	S	15.00	1,280	41.2	58.8	15
Miller's Choice.....	11-10	.....	6-28	B	14.66	1,360	38.9	61.1	16

SHORT DESCRIPTION OF VARIETIES TESTED**SMOOTH-HEADED VARIETIES**

Purple Straw, Red May, and Fultz are smooth-headed wheats with slightly purple straw, white chaff and red berries. Purple Straw is a somewhat more vigorous grower under our conditions than either of the other two. Red May made the shortest straw of the three this year and, at the Iredell farm, the lowest yield per acre. It also has the lowest per cent. of grain to straw of any variety tested. These are all apparently pure wheats, no admixture of other varieties being conspicuously discernible.

The wheat secured from Col. J. S. Carr, of Durham, called Carr's Select, and grown on the Occaneechee farm at Hillsboro, is a smooth-headed variety with heavy straw-colored chaff, red berry and yellow straw. It made a growth of about 45 inches under conditions existing at the Iredell farm in 1911. This variety ranked sixth in yield at both the Iredell and Buncombe farms, making over 21 bushels to the acre at both places. Leap's Prolific seems to be identical with Carr's Select and yielding about the same number of bushels per acre at the Iredell farm, but ranked tenth at the Buncombe farm while Carr's Choice ranked sixth.

Klondyke is a semi-club-headed wheat with purple straw, red chaff and white berry. It grew about 3 feet high at the Iredell farm this year and yielded 15.5 bushels per acre.

BEARDED VARIETIES

Australian Red, Fulcaster, Young's Dietz Mediterranean, Shoaf's and Bearded Fulcaster, all have purple straw, white chaff, and red berries. Three of these, Dietz Mediterranean, Shoaf's and Bearded Fulcaster have an admixture of another bearded variety.

Acme, Miller's Choice, Red Wonder, and Lancaster all have yellow straw, red chaff, and red berries. Lancaster has an admixture of some other variety but the others are practically pure varieties. The accompanying cuts show the general outline of these different wheats.



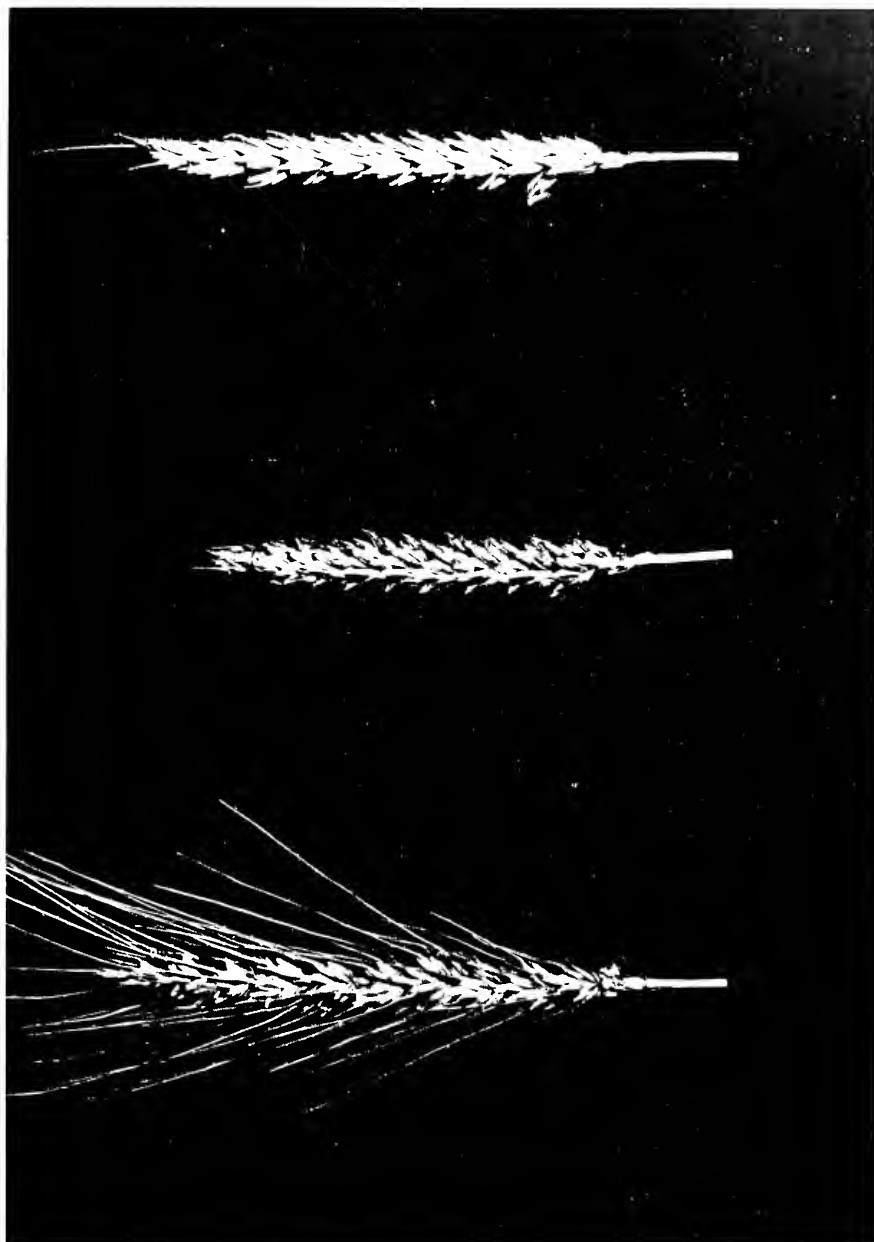
Leap's Prolific.



Fuliz.



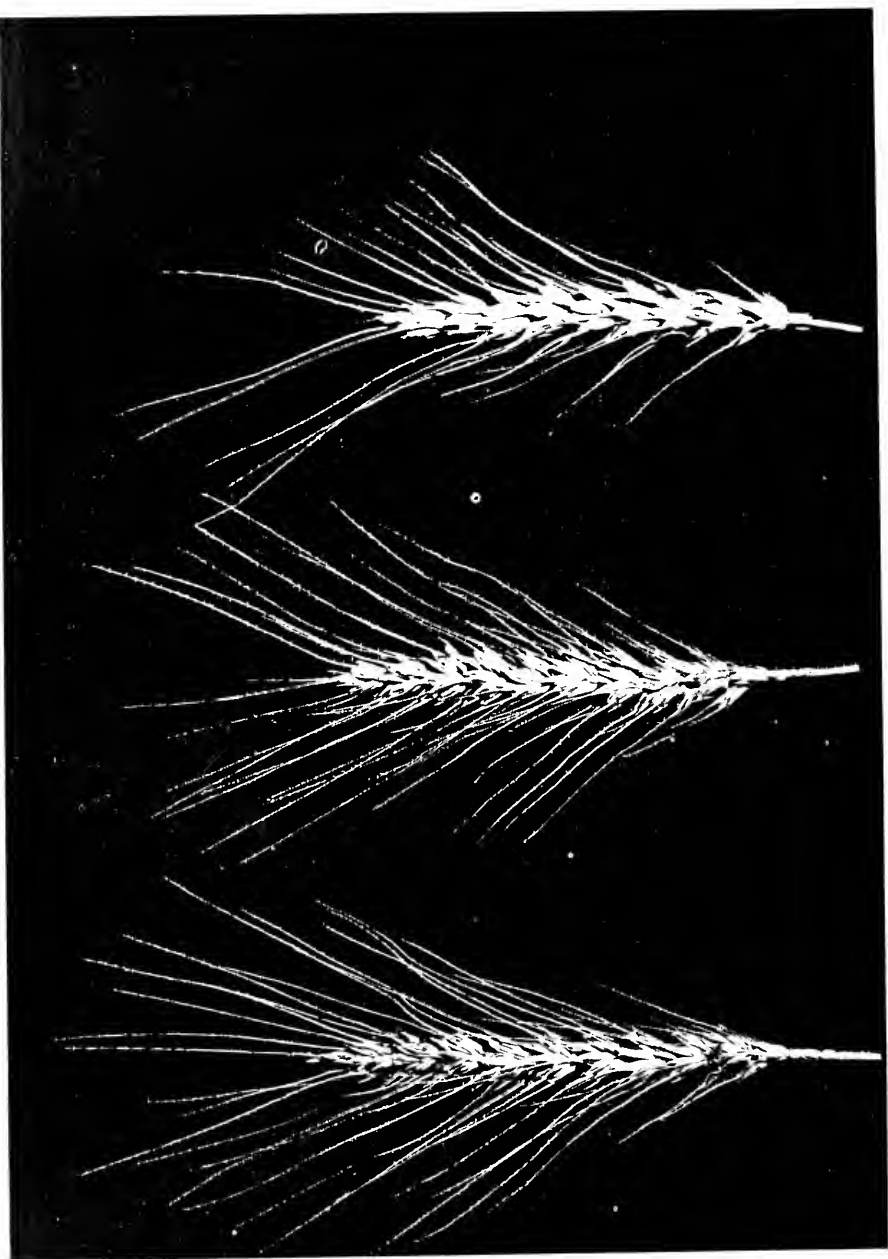
Red May.



Purple Straw

Klondike

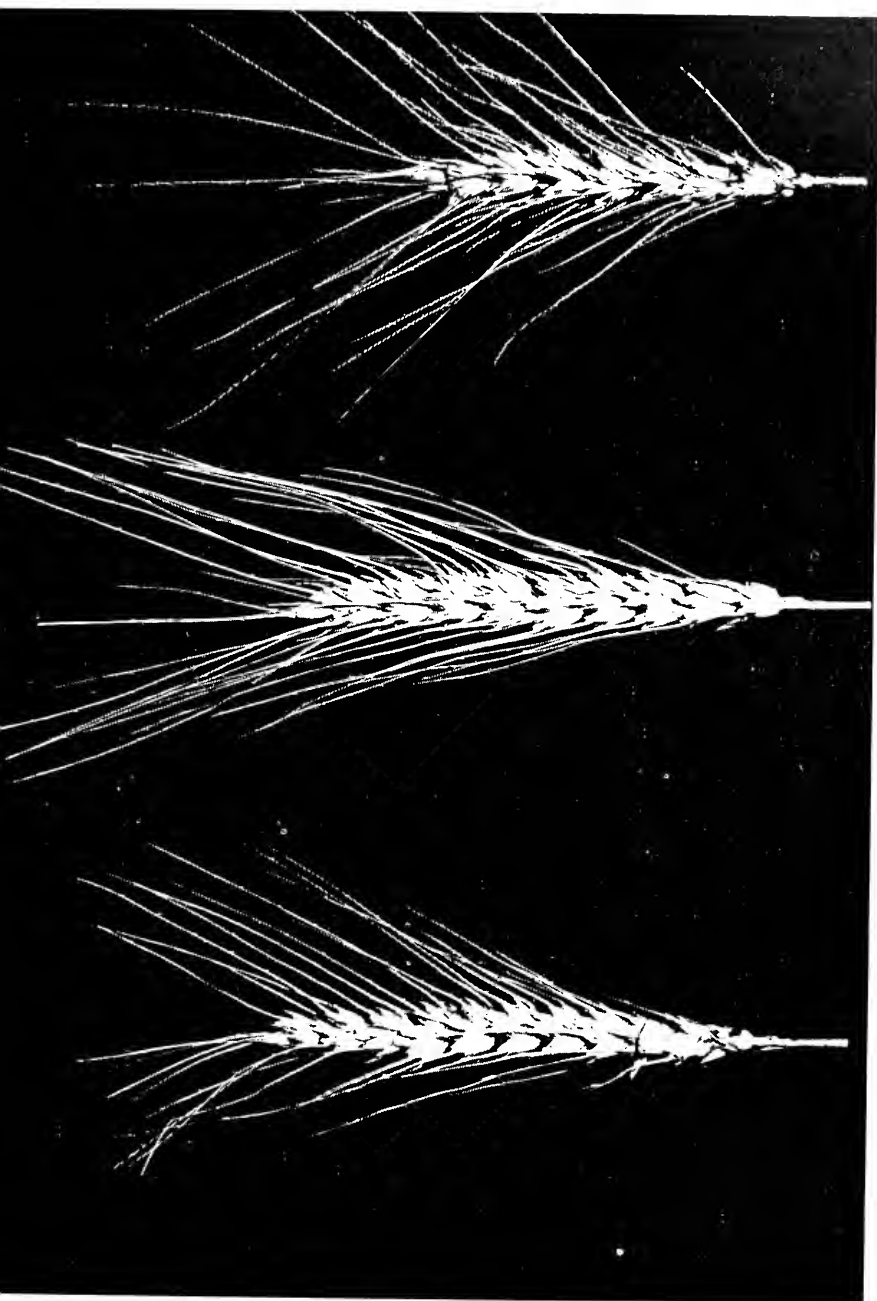
Red Wonder



Dietz Mediterranean.

Australian Red.

Lancaster.



Golden.

Fulvester.

Fulvester Native.

OATS

HISTORY OF OATS

The oat plant, like wheat, seems first to have been domesticated in Europe or Asia Minor. The Greeks knew it and evidence is not lacking that it was plentiful in the South of Italy during the time of the Roman Empire. It has been found in the Swiss lake-dwellings of the Bronze Age. It seems that the Hebrews and Egyptians did not cultivate the oat plant but that its ancient domestication was largely confined to the country north of Italy and Greece.

This plant has not been found in a wild state and indications point to its origin from a single prehistoric form, a native of Eastern temperate Europe and of Tartary.

Oats have always been recognized as a feed for domesticated animals and in times of scarcity, as good food for man. While the crop is still largely grown for horse feed, its use as human food has largely increased in recent years.

The great bulk of the oat crop of the world is produced within the north temperate zone including the countries of Russia, Germany, Norway and Sweden, Canada, and the northern part of the United States. Russia produces more oats than any other country.

CULTIVATION

The principles regarding the preparation of the seedbed for wheat apply to oats and other small grain. Oats can be grown successfully on a greater variety of soils than wheat, and, where possible, fall seeding should be followed, using some of the hardy winter varieties, as the largest yields of grain are obtained from fall sowing when they stand the winter. Much can be done to carry oats through the winter in good condition by thorough preparation of the land and sufficiently early seeding to allow the plants to reach a good root development before winter frosts set in.

The oat plant needs a cool, moist soil, plentifully supplied with organic matter and mineral elements in an available condition. The seedbed should be as thoroughly prepared as for wheat and only the best, cleanest, heaviest seed used in sowing the crop. This crop is a rather gross feeder, however, and will make a good yielder on soils not suited to the growth of wheat. Even sandy soils, on which wheat would bring little returns, will produce a good crop of oats. For this reason this crop is found very profitable on the sandy soils of the eastern part of the State growing in a rotation with cotton.

Both the wheat and the oat crops are frequently damaged by freezing during severe winters on clean land, a result which can largely be offset by sowing early and allowing the crop to get a good growth before the cold weather sets in. The drill is preferable in seeding oats provided the seeding is done early, say September 15th, and the drill rows left open. The hoe-drill is preferable to the disc drill in seeding oats on clean land that heaves badly. If sown late the open furrow method is preferable. By this method the oats are put in the bottom

of a furrow about four inches below the surface and covered shallow. The furrows may be run any desired distance apart. If one could conceive of each hoe on an ordinary hoe drill opening furrows as deep and as wide as those opened by an ordinary "bull-tongue" plow the open-furrow method could be readily understood. This method insures against freezing, and the same result can generally be secured by seeding early in the fall with an ordinary hoe drill and leaving the drill rows open.

The amount of seed to be used in sowing varies from one and a half to four bushels per acre. As a rule, the richer the land, the heavier the seeding may be.

Oats may be grown in a variety of rotations. This general rule must always be kept in mind, however, that whatever rotation is practiced, ample provision must be made for the incorporation of organic matter in the soil. Some rotation, therefore, that includes catch crops and winter cover crops to be *plowed under* for soil improvement will prove best in the end especially in localities where the lands are in a run-down condition.

FERTILIZATION

The fertilization for wheat will generally suit the oat crop though the amount may be somewhat reduced. From 200 to 400 pounds of some high grade fertilizer on fall sown oats followed by a top dressing of nitrate of soda in the spring will generally be found satisfactory.

VARIETIES

There are two great classes of oats, namely: the spreading, or open panicked, and the side, or closed panicked. Each of these classes has a large number of varieties.

SHORT DESCRIPTION OF VARIETIES TESTED IN 1911

Hood's Mammoth, Danish Island, White Tartar King, and the Washington all have large stems, broad leaves, and white grains with medium beards. All but the Washington have closed panicles. All are rank growers and produce an abundance of forage when cut for hay.

The Burt, Red Rust Proof, Virginia Gray, 100 Bushel, Bancroft, Apler, and Culberson have medium to small stems, under ordinary conditions, medium sized leaves, and wide open panicles. The Burt, Apler, and the Red Rust Proof have red grains; the Bancroft has light yellow; the Virginia Gray has gray; while the Culberson and the 100 Bushel have light colored or white grains. All have rather formidable beards.

COMMENTS ON VARIETIES TESTED

Table No. VII shows the results of the variety tests of oats at the Iredell test farm in 1911. Apler and 100 Bushel gave the highest yield here while Hood's Mammoth and White Tartar King, Danish Island and Washington, the four leading fodder varieties, made the lowest yields. (Table No. VII.)

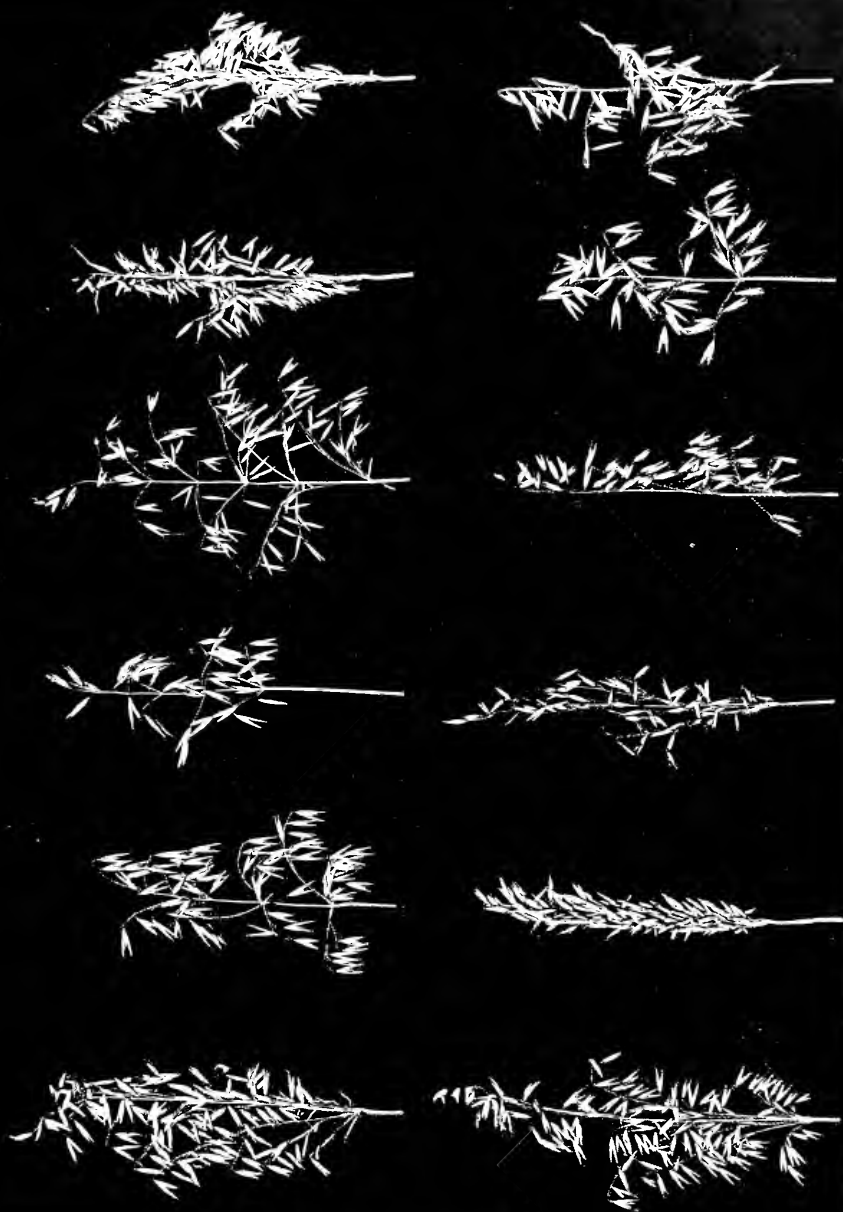
TABLE VII.—VARIETY TEST FALL SOWN OATS ON IREDELL TEST FARM, 1911.

Variety.	Date of Sowing.	Date of Ripening.	Yield Per Acre in Bushels of 32 Pounds.	Pounds of Straw Per Acre.	Per Cent of Grain.	Per Cent of Straw.	Rank According to Yield in Bushels Per Acre.
100 Bushel.....	11-10	5-30	41.2	1,280	50.7	49.3	1
Apler (Georgia grown).....	11-10	5-30	41.2	1,180	52.8	47.2	1
Burt, or 90 Day.....	11-10	5-27	39.8	1,325	49.0	51.0	2
Appler.....	11-10	5-30	38.4	1,290	49.2	50.8	3
Re-Improved Appler.....	11-10	5-30	38.1	1,280	48.8	51.2	4
Dr. Summerlind's.....	11-10	5-29	37.5	1,400	46.1	53.9	5
Culberson.....	11-10	6-17	34.0	1,510	41.9	58.1	6
Baneroft.....	11-10	5-30	31.5	1,210	45.9	54.1	7
Red Rust Proof.....	11-10	5-30	27.8	1,010	46.8	53.2	8
Virginia Gray.....	11-10	6-17	26.5	1,550	35.4	64.6	9
D. R. Beek's.....	11-10	6-1	20.9	1,030	39.4	60.6	10
Washington.....	11-10	6-17	19.5	1,265	33.4	66.6	11
Danish Island.....	11-10	6-17	19.5	1,375	31.3	68.7	11
White Tartar King.....	11-10	6-17	16.0	1,185	30.2	69.8	12
Hood's Mammoth.....	11-10	6-17	15.7	895	36.0	64.0	13

All the varieties tested at the Buncombe farm were spring sown since fall sown oats do not withstand the cold winters of the mountains. Table No. VIII shows the results of the variety test of oats on the Buncombe farm for 1911. It will be noted that here the yields of some of the varieties were almost reversed from what they are at the Iredell farm. The highest yielders were Baneroft, Danish Island, Washington, and White Tartar King in the order named. Whereas, 100 Bushel, one of the highest yielders at Iredell, made the lowest yield at Buncombe.

TABLE VIII.—VARIETY TEST OF SPRING SOWN OATS ON BUNCOMBE TEST FARM, 1911.

Variety.	Date of Sowing.	Date of Ripening.	Yield Per Acre in Bushels of 32 Pounds.	Pounds of Straw Per Acre.	Per Cent of Grain.	Per Cent of Straw.	Rank According to Yield in Bushels Per Acre.
Baneroft.....	4-20	7-12	19.38	1,440	31.6	68.4	1
Danish Island.....	4-20	7-20	18.75	2,060	22.5	77.5	2
Washington.....	4-20	7-15	17.50	1,440	28.0	72.0	3
White Tartar King.....	4-20	7-16	13.13	1,580	21.0	79.0	4
Apler.....	4-20	7-15	12.50	1,560	20.4	79.6	5
Burt, or 90 Day.....	4-20	7-8	12.50	800	33.3	66.7	5
Red Rust Proof.....	4-20	7-15	10.63	640	34.6	65.4	6
100 Bushel.....	4-20	-----	10.63	680	33.3	66.7	6

Washington,
Culbertson.Ayler
Hood's Mammoth.Bauerhoff,
Dr. Sumnerlin's.Virginia Gray,
Jed Basher.White Tartar King,
Rust Proof.Danish Island,
Rust Proof.

SOURCES OF VARIETY SEED WHEAT TESTED IN 1911-12.

Variety.	Firm.	Post-Office.
Red Wonder.....	T. W. Wood & Sons.....	Richmond, Va.
Purple Straw.....	T. W. Wood & Sons.....	Richmond, Va.
Leap s Prolific.....	T. W. Wood & Sons.....	Richmond, Va.
Klondyke.....	T. W. Wood & Sons.....	Richmond, Va.
Fultz.....	T. W. Wood & Sons.....	Richmond, Va.
Red May.....	T. W. Wood & Sons.....	Richmond, Va.
Blue Stem.....	T. W. Wood & Sons.....	Richmond, Va.
Harvest King.....	T. W. Wood & Sons.....	Richmond, Va.
Golden Chaff.....	T. W. Wood & Sons.....	Richmond, Va.
Lancaster.....	T. W. Wood & Sons.....	Richmond, Va.
Fulcaster.....	T. W. Wood & Sons.....	Richmond, Va.
Dietz Mediterranean.....	T. W. Wood & Sons.....	Richmond, Va.
Australian Red.....	T. W. Wood & Sons.....	Richmond, Va.
Aemo.....	S. M. Schindel.....	Hagerstown, Md.
Shoaf's Select.....	R. A. Shoaf.....	Lexington, N. C.
Young's Select.....	T. M. Young.....	Mocksville, N. C.
Miller's Choice.....	B. B. Miller.....	Salisbury, N. C.
Carr's Choice.....	J. S. Carr.....	Durham, N. C.

SOURCES OF VARIETY SEED OATS TESTED IN 1911-12.

Name.	Firm.	Post-Office.
Golden Giant (Side Oats).....	W. A. Burpee & Co.....	Philadelphia, Pa.
Danish Island.....	W. A. Burpee & Co.....	Philadelphia, Pa.
Burpee's Welcome.....	W. A. Burpee & Co.....	Philadelphia, Pa.
White Tartar King.....	W. A. Burpee & Co.....	Philadelphia, Pa.
Virginia Gray.....	T. W. Wood & Sons.....	Richmond, Va.
Washington.....	T. W. Wood & Sons.....	Richmond, Va.
Apler.....	T. W. Wood & Sons.....	Richmond, Va.
Black Tartarian.....	T. W. Wood & Sons.....	Richmond, Va.
Bancroft.....	T. W. Wood & Sons.....	Richmond, Va.
Swedish Select.....	T. W. Wood & Sons.....	Richmond, Va.
Burt.....	T. W. Wood & Sons.....	Richmond, Va.
Red Rust Proof.....	T. W. Wood & Sons.....	Richmond, Va.
Black Spring.....	Diggs & Beadles.....	Richmond, Va.
White Spring.....	Diggs & Beadles.....	Richmond, Va.
Re-Improved Apler.....	Alexander Seed Co.....	Augusta, Ga.
Apler (Georgia grown).....	Hastings Seed Co.....	Atlanta, Ga.
Hundred Bushel.....	Hastings Seed Co.....	Atlanta, Ga.
Beck's Favorite.....	D. R. Beck.....	Thomasville, N. C.

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TWELFTH ANNIVERSARY

—ON—

FOOD ADULTERATION

UNDER THE PURE FOOD LAW

PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION

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* Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, October 16, 1911.

SIR:—I submit herewith manuscript covering the investigations that have been made during the past year under the State Food Law, chapter 368, Laws of 1907. I recommend its publication as the November Bulletin and Twelfth Annual Report.

Respectfully submitted,

W. M. ALLEN,
State Food Chemist.

HON. W. A. GRAHAM,
Commissioner of Agriculture.

REPORT ON FOOD ADULTERATION FOR 1911.

By W. M. ALLEN, STATE FOOD CHEMIST.

ASSISTED BY

W. A. SMITH, ASSISTANT CHEMIST,

R. B. HALL, ASSISTANT CHEMIST

A general statement, decisions of the court, a short discussion on hearings and standards, an extract from the Food Law, rules on labeling, a summary of results obtained during previous years, and the results of the examination of food products for the year 1911—constituting the twelfth annual report under the Food Law—are presented in the following pages:

GENERAL STATEMENT.

When of general interest or when it will facilitate the enforcement of the Food Law, examinations will be made of food or beverages for parties within the State, provided samples of same are taken and sent to the Food Chemist in accordance with instructions from the Department, and the required information concerning the sample is furnished.

Results of analyses are sent to parties sending samples and parties from whom samples are obtained by the Department, as well as the manufacturer of the products.

It is the desire of the Department to put information into the hands of manufacturers, dealers and consumers of food, and to assist them in every way it can to know and manufacture, handle and use the best, most desirable and most wholesome food products. The Food Control is in the interest of the honest manufacturer, the honest dealer, and for the protection of the consumer.

PROSECUTIONS UNDER THE FOOD LAW.

During the year only two prosecutions under the Food Law have been concluded which are as follows:

State v. E. M. Adair, in Buncombe County Superior Court, for the sale of adulterated and misbranded syrup. The defendant pleaded guilty.

State v. R. W. Harkins, in Buncombe County Superior Court, for the sale of adulterated butter. Defendant was convicted.

HEARINGS UNDER FOOD LAW.

The State Food Law provides that if any of the provisions of the act are found to have been violated, the party committing the offense shall be notified of the facts in the case, and given an opportunity to show cause why he should not be prosecuted for the same. During the year about 200 such notices and hearings have been given. In each case there was a violation of the law. Many of them, however, were slight and trivial, while many others were of a more serious nature. A large

number of violations by retail dealers are due to carelessness in their purchases. They allow themselves to be imposed upon and then in turn proceed to impose upon their customers. The Department has worked faithfully for several years to cause the dealers to know and comply with the requirements of the law, but they go along until they are caught and then plead ignorance of the law or of the facts in the case, and think they should not be prosecuted for the offense when they have actually imposed upon their customers, by selling them short weight or adulterated or misbranded products.

When dealers can show at the hearings reasonable cause why they should not be prosecuted for violations, the matter is dropped. When they can not show a good reasonable cause why they should not be prosecuted, the facts in the case are reported to the State Solicitors for prosecution.

STANDARDS AND REGULATIONS.

NOTES ON.

The Food Law provides that the Board of Agriculture shall adopt and publish standards of strength and purity and regulations for the enforcement of the law. It further provides that when the Secretary of Agriculture of the United States has adopted standards for food products that the Board of Agriculture shall adopt them for standards under the State Food Law of North Carolina.

These standards and regulations have been adopted and published in the Food Reports from time to time, and copies in pamphlet form will be sent on application. Some objections have been made to certain of these standards, saying that they are too high, as in the case of ice cream where 14 per cent of milk fat is required. In this and other cases, where the standard has been adopted by the Secretary of Agriculture, the Department and Board of Agriculture have no choice in the matter. The Food Law requires the Board to adopt them and gives the latter no discretion in the matter. However, these standards have been carefully worked out by experts, and have been adopted by most of the States that are enforcing food laws.

Dealers are cautioned to make themselves familiar with the law, the standards and the regulations under the Food Law for they must be enforced. Feeling that the dealers have had time and opportunity to know the law and standards, it will be the policy of the Department in the future to prosecute cases when similar ones have been excused in the past because of ignorance of the law.

EXTRACT FROM FOOD LAW.

The following extract from the Pure Food Law is very important, and the same is herewith printed in order that the groccymen may become more familiar with the requirements of the law.

State Food Law, section 6, defines and describes what constitutes food adulteration. Section 7 defines and describes what constitutes the misbranding of food products. Section 9 provides for a guaranty by which the retail dealer may be exempt from prosecution for violation of the law.

EXTRACT FROM FOOD LAW.

SEC. 6. That for the purpose of this act an article shall be deemed to be adulterated, in the case of food—

First. If any substance has been mixed or packed with it, so as to reduce or lower or injuriously affect its quality or strength.

Second. If any substance has been substituted, wholly or in part, for the article.

Third. If any valuable constituent of the article has been wholly or in part abstracted.

Fourth. If it be mixed, colored, powdered, coated or stained in a manner whereby damage or inferiority is concealed.

Fifth. If it contains any added poisonous or other added deleterious ingredient which may render such article injurious to health. If it contains any of the following substances, which are hereby declared deleterious and dangerous to health when added to human food, to wit: Colors which contain antimony, arsenic, barium, lead, cadmium, chromium, copper, mercury, uranium or zinc; or the following colors: gamboge, corallin, picric acid, aniline, or any of the coal-tar dyes; dulcin, glucin, or any other artificially or synthetically prepared substitute for sugar except saccharine; paraffin, formaldehyde, beta-naphthol, abrastol, benzoic acid or benzoates, salicylic acid or salicylates, boric acid or borates, sulphurous acid or sulphites, hydrofluoric acid or any fluorine compounds, sulphuric acid or potassium sulphate or wood alcohol: *Provided*, that catsups and condimental sauces may, when the fact is plainly and legibly stated in the English language on the wrapper and label of the package in which it is retailed, contain not to exceed two-tenths of one per cent of benzoic acid or its equivalent in sodium benzoate. Fermented liquors may contain not to exceed two-tenths of one per cent of combined sulphuric acid, and not to exceed eight-thousandths of one per cent of sulphurous acid.

Sixth. If it consists in whole or in part of a filthy, decomposed or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal or one that had died otherwise than by slaughter. In addition to the ways already provided, sausage shall be deemed to be adulterated if it is composed in any part of liver, lungs, kidneys or other viscera of animals: *Provided*, that the use of animal intestines as sausage casings shall not be deemed to be an adulteration.

Seventh. If it differs in strength, quality or purity from the standards of purity of food products that have been or may be from time to time adopted by the Board of Agriculture.

SEC. 7. That the term "misbranded," as used herein, shall apply to all drugs or articles of food, or articles which enter into the composition of food, the package or label of which shall bear any statement, design or device regarding such article or the ingredients or substances contained therein which shall be false or misleading in any particular, and to any food or drug product which is falsely branded as to the State, Territory or country in which it is manufactured or produced.

That for the purpose of this act an article shall also be deemed to be misbranded, in the case of food—

First. If it be an imitation of or offered for sale under the distinctive name of another article.

Second. If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when not so, or if the contents of the package as originally put up shall have been removed, in whole or in part, and other contents shall have been placed in such package, or if it fail to bear a statement on the label of the quantity or proportion of any morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis, indica, chloral hydrate or acetanilide, or any derivative or preparation of any such substances contained therein.

Third. If in package form, and the contents are stated in terms of weight or measure, they are not plainly and correctly stated on the outside of the package.

Fourth. If the package containing it or its label shall bear any statement, design or device regarding the ingredients or the substances contained therein, which statement, design or device shall be false or misleading in any particular: *Provided*, that an article of food which does not contain any added poisonous or deleterious ingredients shall not be deemed to be adulterated or misbranded in the following cases:

First. In the case of mixtures or compounds which may be now or from time to time hereafter known as articles of food under their own distinctive names, and not an imitation of or offered for sale under the distinctive name of another article, if the name be accompanied on the same label or brand with a statement of the place where said article has been manufactured or produced.

Second. In the case of articles labeled, branded or tagged so as to plainly indicate that they are compounds, imitations or blends, and the word "compound," "imitation" or "blend," as the case may be, is plainly stated on the package in which it is offered for sale: *Provided*, the labeling is according to the rules prescribed by the Board of Agriculture: *Provided*, that the term "blend," as used herein, shall be construed to mean a mixture of like substances, not excluding harmless coloring or flavoring ingredients used for the purpose of coloring and flavoring only.

SEC. 9. That no dealer shall be prosecuted under the provisions of this act when he can establish a guaranty signed by the wholesaler, jobber, manufacturer or other party, residing in North Carolina, from whom he purchased such articles, to the effect that the same is not adulterated or misbranded within the meaning of this act, designating it.

LABELING FOOD PRODUCTS

RULES OF THE STATE BOARD OF AGRICULTURE UNDER FOOD LAW.

A label must be, as far as possible, attached to each package, and contain, in addition to other information, the name of the material, the name and address of the manufacturer, importer or jobber. When the words "artificial," "imitation," "compound," "adulterated," or other words of similar import, are required, they must be on the principal label and immediately precede or follow the word or words they modify, which must be the principal word or words of the label, and be in at least half the size and same style of type and on the same kind of background as the word or words with which they are closely associated. The principal words in the label must be printed in either dark-colored letters on a light-colored background or light-colored letters on a dark-colored background. Any statement that is required on the principal label of a barrel or cask of molasses, molasses compound, sirup or compound sirup, vinegar or compound vinegar, must appear on one end or head of the barrel or cask; and if the principal label or any part of it appears on both ends of barrel or cask, they shall be identical, one to the other.

The label on bottled soft drinks must bear the name and address of the bottler.

Where the presence of preservatives, coloring matter or other substance or substances is required to be printed on the label, the printing must be done clearly and conspicuously on the label, in type not smaller than *brevier heavy gothic caps*, and on the same kind of background as the rest of the label.

Retail dealers, while offering food or beverage for sale, must keep the label so that it may be seen by purchaser or inspector, and the label must be so kept that it will remain legible.

WORK OF THE YEAR 1911.

During the year 906 samples of foods and beverages have been analyzed.

SUMMARY OF RESULTS OF THE EXAMINATION OF FOOD PRODUCTS

Name of Sample	Total Number of Samples Examined	Number of Samples Properly Branded, Labeled and not Adulterated	Number of Samples not Properly Labeled	Number of Samples Adulterated or Misbranded	Per cent of Samples Illegal
Beer and near beer.....	5	4		1	20.00
Butter.....	47	42	1	4	8.51
Cheeses.....	18	15		3	16.66
Chemical fruit preservatives.....	8			8	100.00
Coffee and coffee substitutes.....	37	26	2	9	24.30
Cream of tartar.....	17	17			
Dried fruit.....	11			11	100.00
Extracts, banana, imitation.....	4	1		3	75.00
Extracts, lemon.....	114	69		45	39.65
Extracts, orange.....	19	12		7	36.84
Extracts, peach, imitation.....	3			3	100.00
Extracts, peppermint.....	7	3		4	57.14
Extracts, pineapple, imitation.....	5	2		3	60.00
Extracts, strawberry, imitation.....	7	2		5	71.43
Flour.....	310	293		17	5.48
Honey.....	16	15		1	6.66
Ice cream and ice cream substitutes.....	41	24		19	41.46
Maple sirups.....	20	11	2	9	45.00
Miscellaneous samples.....	19	19			
Molasses and sirups.....	6	6			
Olive and other table and cooking oils.....	23	17	3	3	13.04
Oysters.....	17	17			
Rice.....	3	1		2	66.66
Soda water, bottled.....	12	2		10	83.33
Sweet Oil.....	33	4	2	27	81.81
Vinegar.....	104	78		26	25.00
Total.....	906	678	10	228	24.61

METHODS OF ANALYSIS.

The methods of analysis of the Association of Official Agricultural Chemists were followed in the examination of the products presented in this report.

BEERS AND IMITATION OR NEAR BEERS.

Malt liquor is a beverage made by the alcoholic fermentation of an infusion, in potable water, of barley malt and hops, with or without unmalted grains.

Beer is a malt liquor produced by bottom fermentation, and contains not less than 5.00 per cent of extractive matter and 0.16 per cent of ash, chiefly potassium phosphate, and not less than 2.75 per cent of alcohol by volume.

Lager beer is beer which has been stored in casks for a period not less than three months, and contains not less than 3.00 per cent of alcohol by volume.

Only five samples of these produces were examined, all of which were

RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9016	Near Beer*	.....	Ernest Caudle, Rural Hall.....
9357	Temperance Beer, No Tax*	Robert Portner Brewing Co., Alexandria, Va.	Jas. D. McNeill, Fayetteville.....
9356	do*	do.....	do.....
8991	Near Beer.....	New South Brewing Co., Middleboro, Ky.	V. Wells and C. Lang, Asheville..
8404	Beer, Edelbrau*.....	Roseneck Brewing Co., Richmond, Va.	Ed. Stone, Sanford.....

* Sent to Department for analysis.

BUTTER AND BUTTER SUBSTITUTES.

Butter is the clean, nonrancid product made by gathering in any manner the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of the other milk constituents, with or without salt, and contains not less than 82.50 per cent of milk fat.

Renovated butter, process butter, is the product made by melting butter and working, without the addition or use of chemicals or any substance except milk, cream or salt, and contains at least 82.50 per cent of milk fat and not more than 16 per cent of water.

Oleomargarine, oleo or butterine is a substitute for butter, made from other and cheaper fats than butter. It is manufactured so as to improve its granulation and texture, and a more or less butter-like

sent to the Department by officers of the law for the determination of alcohol, the object of the latter being to see if the sale of the same was in violation of the prohibition and near-beer laws. The Department of Agriculture having no authority of law or funds for work under the prohibition law has had to decline to do such work except in a limited number of cases when it would aid officials in the enforcement of the law. Dealers, wishing to know whether a product could or could not be legally sold, have often offered to pay for examination of beverages, but the Department having no authority of law to do the work and charge for the same, had to decline to do it.

Two of the samples examined proved to be beers and the other near-beer.

OF BEERS AND NEAR BEERS.

Laboratory Number— Alcohol— by Volume	Remarks and Conclusions
9016 4.47	Beer, misbranded, intoxicating; sale illegal.
9357 0.50	Temperance beer.
9356 0.52	do.
8991 2.10	Near Beer
8404 4.65	Beer, intoxicating.

flavor and odor are imparted to it by churning it with milk, skim-milk, cream or buttermilk, or, possibly, by mixing a small amount of butter with it.

Forty-seven samples of butter were examined, four of which were adulterated or misbranded within the meaning of the Food Law. Two of the four, No. 8633 and No. 8634, were branded "1 pound pure Jersey butter" but weighed not more than 14 ounces each. One sample, No. 9031, contained more than the legal per cent of water. Sample No. 8985 was below standard, containing less than the legal per cent of fat and more than the legal per cent of water, and one sample was not properly labeled; it being in package form and did not show on label the name of the manufacturer. Of these samples 8.51 per cent were sold in violation of the law.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8561	Butter, process, Meadow- Brook.	Armour & Co., Chicago, Ill.	J. F. Powers & Son, Fayetteville.
9385	Butter	Bailey, Paul, Raleigh, N. C.	Rudy & Buffaloe, Raleigh.
8712	Butter, Gilt Edge.	Braswell, J. C., Battleboro, N. C.	G. F. Jones, Rocky Mount.
8398	Butter.	Catawba Creamery Co., Hickory, N. C.	Stradley & Luther, Asheville.
9382	do.	Coley, S. D., Raleigh.	J. F. Cain & Son, Raleigh.
9386	Butter, Better.	Fairmont Creamery Co., Omaha, Neb.	Rudy & Buffaloe, Raleigh.
8702	Butter, Fox River	Fox River Butter Co., Aurora, Ill.	S. W. Sanders, Wilmington.
9387	Butter.	Friedman Mfg. Co., Norfolk, Va.	Thiem & Birdsong, Raleigh.
8590	Butter, process.	do.	Geo. E. Perry, Henderson.
8987	Butter.	Glasspie, M.	C. Sawyer, Asheville.
8479	do.	Haley, J. S., Cary, N. C.	Rudy & Buffaloe, Raleigh.
8704	do.	do.	H. F. Harr, Wilmington.
8519	do.	Morrison, John R., Statesville, N. C.	Morrison, John R., Statesville
9389	do.	do.	H. J. Johnson, Raleigh.
8634	do.	Oceoneeche Farm, Hillsboro, N. C.	Perry-Wood Co., Durham.
8633	do.	do.	do.
9383	do.	Oliver, C., Raleigh, N. C.	J. F. Cain & Son, Raleigh.
8400	do.	Robinson, L. W., & Co., Bat Cave, N. C.	Stradley & Luther, Asheville
9388	do.	Scott & Co., Norfolk, Va.	W. B. Mann & Co., Raleigh.
8710	Butter, process, Four Leaf Clover.	do.	W. J. Taylor, Wilson.
9390	Butter.	Stikeleather, J. T., Statesville, N. C.	H. J. Johnson, Raleigh.
9381	do.	Terry, Geo., Raleigh, N. C.	T. L. McCullers, Raleigh.
8399	do.	Yoder, H. L., Clairmont, N. C.	Stradley & Luther, Asheville.
8701	Butter, Elgin	Young, W. L., & Co., New York,	Peoples Supply Co., Wilmington
8703	do.	do.	Holmes Gro. Co., Wilmington
8950	Butter.	do.	W. L. Barnett, Asheville.
8951	do.	do.	do.
8591	do.	do.	Breedlove & McFarland, Oxford
9384	do.	do.	J. F. Cain & Son, Raleigh.
9032	do.	do.	Carland & McGuire, Canton
8982	do.	do.	Chifton Hotel, Asheville.
9059	do.*	do.	F. B. Guilford, Aurora.
8955	do.	do.	Groves Grocery Co., Asheville
8954	do.	do.	do.
8931	do.	do.	Hopper, Major, Shelby.
9031	do.	do.	Hyder & Shermer, Henderson ville.
8953	do.	do.	J. B. Ingle, Asheville.

* Sent to Department for analysis.

BUTTER AND BUTTER SUBSTITUTES.

Laboratory Number	Reading Refractometer 40° C.	Refractive Index	Water— Per Cent	Remarks and Conclusions
8561	41.50	1.4534	12.00	Butter.
9385	41.00	1.4531	15.57	do.
8712	41.50	1.4534	8.40	do.
8398	42.00	1.4538	-----	do.
9382	40.00	1.4524	8.49	do.
9386	41.00	1.4531	12.18	do.
8702	41.50	1.4534	6.26	do.
9387	42.00	1.4538	10.39	do.
8590	43.00	1.4545	-----	Butter, renovated.
8987	41.00	1.4531	12.90	Butter.
8479	43.00	1.4545	-----	do.
8704	41.50	1.4534	6.08	Butter, not properly labeled, shows only initials of manufacturer.
8519	40.00	1.4524	-----	Butter.
9389	40.00	1.4524	10.84	do.
8634	41.00	1.4531	12.73	Butter, misbranded. It was labeled "1 Pound Pure Jersey Butter," but only weighed fourteen ounces; sale was illegal.
8633	41.00	1.4531	11.41	Butter, misbranded. It was labeled "1 Pound Pure Jersey Butter," but weighed only thirteen and a half ounces; sale illegal.
9383	40.00	1.4524	13.45	Butter.
8400	43.00	1.4545	-----	do.
9388	42.00	1.4538	14.49	do.
8710	42.50	1.4541	5.48	do.
9390	40.00	1.4524	10.55	do.
9381	41.00	1.4531	11.73	do.
8399	41.00	1.4531	-----	do.
8701	41.50	1.4534	8.87	do.
8703	41.50	1.4534	9.23	do.
8950	40.00	1.4524	8.18	do.
8951	41.00	1.4531	13.58	do.
8591	41.00	1.4531	9.00	do.
9384	40.00	1.4524	11.59	do.
9032	41.00	1.4531	15.89	do.
8982	41.00	1.4531	-----	do.
9059	42.20	1.4539	-----	Butter, rancid from age.
8955	42.00	1.4538	-----	Butter.
8954	40.00	1.4524	11.13	do.
8931	41.00	1.4531	13.85	do.
9031	41.00	1.4531	19.38	Butter, containing more than the legal per cent. of water; sale illegal.
8953	40.00	1.4524	15.09	Butter.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8952	Butter.....		J. B. Ingle, Asheville.....
9029	do.....		P. W. Love & Son, Asheville.....
8949	do.....		R. L. Owenby, Asheville.....
8984	do.....	Whitted, P. L., Weaverville, N. C.	J. O. Whitted, Asheville.....
8520	do*		L. M. McCormick, Asheville.....
8948	do ..		R. L. Owenby, Asheville.....
9030	do.....		do.....
8413	do*		C. S. Patch, Southern Pines.....
8985	do.....		C. Sawyer, Asheville.....
8986	do.....		do.....

* Sent to the Department for analysis.

CHEESES.

Cheese is the sound, solid, and ripened product made from milk and cream by coagulating the casein thereof with rennet or lactic acid, with or without the addition of ripening ferments and seasoning, and contains, in the water free substance, not less than 50 per cent of milk fat.

A product of this kind containing less than 50 per cent of milk fat in the water free substance, must be sold as a substitute for cheese, or

RESULTS OF THE EXAMI-

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8508	Cheese, cream...	C. W. Antrim & Sons, Richmond, Va.	H. J. Johnson, Raleigh.....
8511	Cheese, milk.	do	L. H. Adams, Raleigh.....
8514	do.....	do	do.....
8711	Cheese.....	Armour & Co., Richmond, Va.	F. Y. Arrington, Rocky Mount ..
8513	Cheese, cream ..	J. G. Ball & Co., Raleigh, N. C.	W. L. Fort Gro. Co., Raleigh.....
8713	do.....	W. S. Cross, Suffolk, Va.....	J. B. Cummings, Tarboro.....
8715	Cheese.....	Friedman & Co., Norfolk, Va.....	W. J. Burgess, Enfield.....
8509	Cheese, cream ..	Harvey & Co., Baltimore, Md.....	Rudy & Buffaloe, Raleigh.....
8510	do	George Marsh & Co., Raleigh, N. C.	J. F. Cain & Son, Raleigh.....

BUTTER AND BUTTER SUBSTITUTES—*Continued.*

Laboratory Number	Reading Refractometer, 40°C.	Refractive Index	Water—Per Cent	Remarks and Conclusions
8952	40.00	1.4524	6.09	Butter.
9029	41.00	1.4531	14.95	do.
8949	40.00	1.4524	10.97	do.
8984	40.00	1.4524	10.17	do.
8520	42.00	1.4524	.....	do.
8948	41.00	1.4531	11.13	do.
9030	41.00	1.4531	11.05	do.
8413	42.00	1.4524	.....	do.
8985	40.00	1.4524	24.37	Butter, containing more than the legal per cent of water and less than the legal per cent of fat; sale illegal.
8986	40.00	1.4524	13.58	Butter.

as a milk cheese, or under some name that will indicate to the purchaser that it is not a standard cheese.

Under the head of cheese eighteen samples were examined, of which three were below standard. Nos. 8511 and 8514 contained less than the required amount of fat, but were sold for milk cheese and not cheese. No. 8635 contained less than half the amount of required milk fat. The sale of this product as cheese was a violation of the law. No. 8509 was slightly below standard, but it was probably not intentional on the part of the manufacturer. No. 8621 was misbranded. It claimed to weigh 21 pounds when in fact it weighed only 20 pounds.

NATION OF CHEESES.

Laboratory Number	Fat, Per Cent—(Water-free Basis)	Reading Refractometer, 40°C.	Refractive Index	Water—Per Cent	Adulterants	Remarks and Conclusions
8508	51.77	42	1.4538	33.50	None found.....	Cheese.
8511	29.78	42	1.4538	41.96	do.....	Cheese, milk.
8514	27.54	42	1.4538	43.00	do.....	do.
8711	50.06	40	1.4524	29.97	do.....	Cheese
8513	53.76	43	1.4545	36.97	do.....	do.
8713	51.61	41	1.4531	24.11	do.....	do.
8715	16.27	40	1.4527	48.32	do.....	Cheese, milk; the sale of this product as cheese is a violation of the law.
8509	48.76	42	1.4538	28.08	do.....	Cheese below standard in butter fat.
8510	51.83	42.5	1.4541	34.33	do.....	Cheese.

RESULTS OF EXAMINATION

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8506	Cheese, cream	Norris Bros., Raleigh, N. C.	A. S. Womble, Raleigh.
8622	do.	E. A. Saunders & Sons, Richmond, Va.	C. E. Jourdan, Durham.
8505	do.		C. Sawyer, Asheville.
8512	do.	Scott & Co., Norfolk, Va.	C. C. Jones & Son, Raleigh.
8507	do.	do.	W. B. Mann & Co., Raleigh.
8621	do.	Swift & Co., Durham, N. C.	J. D. Edwards, Durham.
8620	Cheese	do.	N. E. Couch, Durham.
8635	do.	Thomas-Howard Co., Durham, N. C.	R. E. Hurst, Durham.
8623	Cheese, cream		J. McLennon, Durham.

CHEMICAL FRUIT PRESERVATIVES.

The use of antiseptics or chemical preservatives in foods and beverages is an evil that has for several years demanded the attention of food officials.

The knowledge that we have of the effect of these preservatives on digestion and health tends to show that they are deleterious and that their effect on the health of the consumer depends upon the quantity and frequency of the dose.

An investigation by the Bureau of Chemistry, United States Department of Agriculture, has shown conclusively that the use in foods of at least three of these chemical preservatives, viz., boric acid or borates, salicylic acid or salicylates, sulphurous acid or sulphites, is deleterious and dangerous to health.

The investigation showed that boric acid or borates, when taken into the body with food to the amount of four or five grains per day, continued for some time, results in most cases in loss of appetite and a feeling of fullness and uneasiness in the stomach, which in some cases resulted in nausea, with a general tendency to produce a dull and persistent headache.

Regarding salicylic acid, the investigation showed that it is, when used in foods, at first a stimulant, increasing the solubility and absorption of food elements from the alimentary canal. It soon, how-

OF CHEESES—Continued.

Laboratory Number	Fat, Per Cent— (Water-free Basis)	Reading Refractometer, 40°C.	Refractive Index	Water— Per Cent	Adulterants	Remarks and Conclusions
8506	54.21	42.0	1.4538	30.87	None found	Cheese.
8622	51.72	42.5	1.4541	31.66	....do	do.
8505	52.86	.....	.....	29.06	....do...	do.
8512	50.34	42.5	1.4541	31.69	....do...	do.
8507	50.69	42.0	1.4538	35.70	....do...	do.
8621	50.03	42.0	1.4538	37.22	....do.	Cheese, short weight, was labeled 21 lbs., but weight was 14 oz. short.
8620	53.27	42.5	1.4541	35.66	....do...	Cheese.
8635	23.51	42.0	1.4538	46.85	....do...	Cheese, low in fat, it is not a cream cheese, and was probably made from milk; sale as cheese illegal.
8623	51.59	42.0	1.4538	31.13	....do.....	Cheese.

ever, loses its stimulating effect and becomes a depressant, tending to break down the tissues faster than they are rebuilt, to diminish the weight of the body and in some cases to result in illness.

The results of the investigation were very decidedly unfavorable to the use of sulphurous acid in any quantity or for any period of time, and showed the desirability of avoiding the use of it in products intended to be used for human food.

As the use of chemical preservatives in food has fallen into disfavor and has become a violation of many of the food laws of the country, these preservatives are being offered to the trade under proprietary names, or names by which their constituents are not recognized. The use of salicylic acid or any other chemical preservative in food, except 0.1 of one per cent of benzoate of soda, renders the sale of the food a violation of the law, and believing that the use of benzoate of soda is more or less objectionable, the Department most earnestly advises against its use.

Under this head only eight samples were examined, all of which proved to be compounds containing about 40 per cent of salicylic acid which is the antiseptic or preservative in the powder. For further information on this subject see the Food Report of this Department for the year of 1907.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9207	Fruit Powder, Scott's.....	John M. Scott & Co., Charlotte, N. C.	D. L. Cauble, Salisbury.....
9206	do.....	do.....	D. W. Julian, Salisbury.....
9211	do.....	do.....	W. M. Harris, Salisbury.....
9213	do.....	do.....	A. D. Harkey, Salisbury.....
9208	do.....	do.....	Taylor & Co., Salisbury.....
9212	do.....	do.....	J. S. West & Co., Salisbury.....
9210	do.....	do.....	H. Z. White, Salisbury.....
9209	do.....	do.....	T. F. Young & Co., Salisbury.....

COFFEE AND COFFEE SUBSTITUTES.

Coffee is the seed of a small tree, *coffea*, whose fleshy fruit is about the size of a small cherry, and contains two seeds joined on their flat sides, which when freed from the pulp and the enveloping membrane are the coffee beans of commerce.

Roasted coffee is coffee which by the action of heat has become brown and developed its characteristic aroma, and contains not less than 10 per cent of fat and 3 per cent of ash.

The principal action or stimulating constituent of coffee is caffeine, a white, bitter crystallizable substance.

The principal material which is used to mix with and adulterate coffee is chicory, though cereals and leguminous seeds, such as wheat, rye, barley, beans and peas are often used. Many brands of so-called coffee on the market contains from 20 to 60 per cent of chicory. The manufacturers of these products generally claim that the chicory is added not to adulterate, but to actually improve the quality and to give strength to the coffee. This claim is misleading to the public. Roasted chicory contains a large amount of caramel and starchy matter, that impart to the product, when made into a liquid for use as a beverage, a black, thick, soup-like appearance. The effect produced in coffee by chicory can no more correctly be regarded as adding strength to the coffee than if so much roasted starch and caramel had been added to it. *Chicory is not added to coffee to give it strength, but to cheapen the product.*

The State Food Law provides that a product is adulterated: if any substance has been mixed or packed with it so as to reduce or lower

CHEMICAL FRUIT PRESERVING POWDERS.

Laboratory
Number

Remarks and Conclusions

9207	Salicylic acid labeled "fruit powder," when in fact it is a compound of salicylic acid and should be so labeled. It is a chemical preservative, a drug, that when used in food renders the latter deleterious to health and the sale illegal.
9206	do.
9211	do.
9213	do.
9208	do.
9212	do.
9210	do.
9209	do.

its quality or strength, or if any substance has been substituted wholly or in part for the article. The addition of chicory to coffee reduces and lowers its strength and quality just as much as the addition of the same amount of roasted ground wheat or rye, or roasted potato or any other roasted starchy substance, and is an adulterant. The addition of chicory or any other of the above substances to coffee, without stating the fact on the label, is a violation of the law. Chicory and cereals cost less than one-fifth the price of coffee. Then why pay the price of coffee for chicory and cereals when the latter are mixed with coffee?

It is advisable to buy unground coffee and have it ground, then you get what you pay for. Under the head of coffee and coffee substitutes 37 samples were examined, 9 of which were adulterated, misbranded, or misrepresented by either the manufacturer or dealer. Four samples of these compounds of chicory, coffee, cereals, etc., were sold by the packers under what they term trade or proprietary names, viz.: "Money Saver" and "Tar Heel." It appears that these names are adopted to evade the law. These products, composed of chicory, cereals, and coffee, resemble the latter in appearance. Samples of them were purchased by an inspector for coffee, and I dare say that they are constantly sold to consumers as such, the latter believing that they are getting coffee. Sample No. 8766 was branded coffee and chicory when in fact it was about 40 per cent coffee and 60 per cent chicory. It should be labeled chicory and coffee, the former being in excess should occupy the more prominent place in the label.

A purchaser should always read the label of a food product, otherwise he will often pay for that which he does not get.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8765	Money Saver.....	Aragon Coffee Co., Richmond, Va.	S. Meyer, Enfield.....
8766	Coffee and chicory, Money Saver.....	do.....	Pamlico Gro. Co., Washington..
8636	Money Saver.....	do.....	I. A. Burnett, Durham.....
9240	Coffee, Blanke's World's Fair.....	Blanke, C. F., Tea and Coffee Co., St. Louis, Mo.	V. F. Tarleton, Wadesboro.....
8481	Coffee, Elk.....	Bohea Coffee Co., Baltimore, Md.	Rudy & Buffaloe, Raleigh.....
8503	Coffee, blend, B. D. and F.	Carhart & Bros., New York, N. Y.	F. G. Paul & Bro., Washington..
8656	Coffee, blend, Favorite.....	Carlton, F. M., Durham, N. C. (jobber).	F. M. Carlton, Durham.....
9112	Coffee, Mrs. Rorer's.....	Climax Coffee and Baking Powder Co., Indianapolis, Ind.	J. T. Smith, Wilmington.....
8759	Coffee, Consumers Brand.....	Consumers Coffee Co., New Orleans, La.	J. L. Starkey, Greenville.....
8766	Coffee and chicory, Dannemiller's.....	Dannemiller Coffee Co., Brooklyn, N. Y.	T. A. Marshall, Enfield.....
8482	Coffee.....	Fiseher, B., & Co., New York, N. Y.	Rudy & Buffaloe, Raleigh.....
8586	do*.....	do.....	Fry, O. H. Edgemont.....
8655	Coffee, blend, Gill's.....	Gill, Jas. G., Co., Norfolk, Va.	Ellington Grocery Co., Henderson.
8480	Coffee.....	do.....	C. C. Jones, Raleigh.....
8762	Coffee, compound.....	Gillies Coffee Co., New York.....	W. S. White, Edenton.....
9115	Coffee, Gregg's Brazilian.....	Gregg, C. D., Tea and Coffee Co., New York, N. Y.	J. F. Powers & Son, Fayetteville.
9058	Coffee and chicory, Carolina.....	Hall & Bass, Norfolk, Va.	Copeland Bros. & Co., Guilford.
9111	Coffee, Carolina.....	do.....	J. L. Bolton, Wilmington.....
8761	do.....	do.....	Plymouth Mercantile Co., Plymouth.
8763	do.....	do.....	M. Hathaway, Edenton.....
8764	Coffee, Monitor.....	Hall & Bass, Norfolk, Va.	Ausbon & Co., Seotland Neck.....
8779	Coffee, Peerless.....	do.....	I. A. Burnett & Son, Durham.....
8637	Coffee, Merrimac.....	do.....	J. McLennon, Durham.....
8758	Coffee, Jackson Square.....	Importers Coffee Co., New Orleans, La.	C. R. L. Matthews, Rocky Mount
6384	Coffee, Lipton's.....	Lipton, T. J., Coffee Co., New York, N. Y.	Gaddy & Troy, Concord.....
9239	Tar Heel.....	Norfolk State Coffee Co., Charlotte, N. C.	Campbell & Morris, Charlotte
8654	Coffee, Climax.....	(For) Perry, Geo. E., Henderson, N. C.	G. E. Perry, Henderson.....
9260	Coffee and chicory.....	Potter-Sloan-O'Donahue, New York.	S. W. Sanders, Wilmington.....
9114	Coffee.....	(For) Powers, J. F., & Son, Fayetteville, N. C.	J. F. Powers & Son, Fayetteville.
8504	Coffee, Prize.....	Read, C., & Co., Baltimore, Md.	F. G. Paul & Bro., Washington
6390	Coffee and chicory, Louisiana.....	Reilly Taylor Co., New Orleans, La.	Hardison Co., Wadesboro.....
9009	Coffee and chicorine.....	Simpson Tea and Coffee Co., Asheville, N. C.	Simpson Tea and Coffee Co., Asheville.
9022	do.....	do.....	do.....
9021	do.....	do.....	do.....
9008	Coffee.....	do.....	do.....
9238	Coffee, Metropolitan.....	do.....	V. F. Tarleton, Wadesboro.....
9113	Coffee, Blue Bonnet.....	C. F. Blanke Tea and Coffee Co., St. Louis, Mo.	G. H. Bornemann's, Wilmington

COFFEE AND COFFEE SUBSTITUTES.

Laboratory Number	Microscopic Examination	Remarks and Conclusions
8765	Coffee, chicory, cereal..	Coffee, chicory and cereal.
8760	...do.....	do.
8636	...do.....	Coffee, coffee screenings, chicory and cereal or legume. This product was sold by dealer for pure coffee and coffee screenings. The sale was illegal.
9240	Coffee.....	Coffee.
8481	...do.....	do.
8503	...do.....	Coffee, blend
8656	...do.....	do.
9112	...do.....	Coffee.
8759	...do.....	do.
8766	Coffee, chicory	Chicory and coffee, misbranded. As the chicory is in excess the label should read chicory and coffee; sale illegal.
8482	Coffee.....	Coffee.
8586	.....	Coffee glazed; the glazing does not seem to be of a nature that makes the coffee injurious to health.
8655	Coffee.....	Coffee, blend.
8480	...do.....	Coffee.
8762	Coffee, legume, cereal..	A compound of cereals, legumes and coffee.
9115	Coffee.....	Coffee.
9058	Coffee, chicory	Coffee and chicory; sample contains a small amount of black pepper. Several official samples of this coffee have been examined and pepper was not found.
9111	Coffee.....	Coffee.
8761	Coffee, chicory	Coffee adulterated with chicory; sale illegal.
8763	Coffee.....	Coffee.
8764	Coffee.....	Coffee, blend.
8779	...do.....	Coffee, does not bear name and address of manufacturer or jobber.
8637	...do.....	Coffee.
8758	...do.....	do.
6384	...do.....	do.
9239	Coffee, chicory and cereal.	Coffee containing chicory and cereal. Was sold for pure coffee; sale illegal.
8654	Coffee.....	Coffee.
9260	Coffee and chicory	Coffee and chicory.
9114	Coffee.....	Coffee.
8504	...do.....	Coffee, blend.
6390	Coffee and chicory	Coffee and chicory; the chicory tends to lower the value of the product. Sample contains about 25 per cent chicory.
9009	Coffee, chicory, probably cereal.	Coffee containing a roasted substance not coffee. The product was represented to be coffee; sale illegal.
9022	...do.....	do.
9021	...do.....	do.
9008	...do.....	do.
9238	Coffee.....	Coffee, not properly labeled, does not show name and address of manufacturer or jobber.
9113	Coffee, chicory and cereal.	Coffee, chicory and cereal, and is labeled "Blue Bonnett Ground Coffee" with the word "compound" in smaller letters at bottom of package. Misbranded; sale illegal.

CREAM OF TARTAR.

Cream of tartar, acid potassium tartrate, is a white crystalline powder obtained from the crude cream of tartar which is deposited during the fermentation of grape juice, and from the lees of wine. This acid tartrate is the principal acid in grape juice, and remains in solution

RESULTS OF THE EXAMINA-

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8598	Cream of tartar.....	Antrim, C. W., & Sons, Richmond, Va.	City Grocery Co., Henderson....
8903	do.....	Austin Nichols & Co., New York, N. Y.	Walter Credle & Co., Washington.
8900	do.....	Austin Nichols & Co., New York, N. Y.	F. Y. Arrington, Rocky Mount..
9295	do.....	Bellamy, Robt. R., Wilmington, N. C.	M. J. Skulkin, Wilmington.....
8509	do.....	Carhart & Bro., New York, N. Y.	J. W. Robertson, Scotland Neck..
8899	do.....	Colburn Tea and Spice Co., Philadelphia, Pa.	Strickland & Lewis, Wilson.....
9294	do.....	Durkee, E. R., & Co., New York, N. Y.	Wilmington Grocery Co., Wilmington.
8902	do.....	Fischer, B., & Co., New York, N. Y.	D. Cummings & Co., Tarboro...
8475	do.....	Frank Tea and Spice Co., Cincinnati, Ohio.	W. R. Dorsett & Co., Raleigh....
8600	do.....	do.....	Pitchford & Co., Oxford.....
8901	do.....	Gilbert Bros., Baltimore, Md.	G. F. Jones, Rocky Mount.....
8476	do.....	McCormick & Co., Baltimore, Md.	A. S. Womble, Raleigh.....
8599	do.....	do.....	Davis & Jones, Henderson.....
9296	do.....	Newton Tea and Spice Co., Cincinnati, Ohio	W. G. Lowry, Rockingham.....
8478	do.....	do.....	Bobbitt-Wynne Drug Co., Raleigh.
8477	do.....	do.....	W. B. Mann & Co., Raleigh.....
8904	do.....	do.....	W. Gray Willis, Washington.....

DRIED FRUIT—CURRANTS, DATES AND RASINS.

Dried fruit is the clean, sound product made by drying mature, properly prepared, fresh fruit, and conforms in name to the fruit used in preparation.

The law provides that a product is deemed to be adulterated:

If it consists in whole or in part of a filthy, decomposed, or putrid animal or vegetable substance unfit for food.

It is a well known fact that such dried fruits as currants, dates, etc., will in warm weather, unless kept in a very cool place, become wormy, worm-eaten and unfit for food. The sale of such a product for human

until the sugar in the juice is converted by fermentation into alcohol, in which it is insoluble, when it is precipitated in an impure form.

Cream of tartar is used in medicine but its largest use is in the manufacture of baking powder.

Seventeen samples of cream of tartar were examined and no adulteration was found.

ANALYSIS OF CREAM OF TARTAR.

Laboratory Number	Potassium Bi-tartrate— Per cent.	Adulterants	Remarks and Conclusions
8598	97.20	None found.....	Cream of tartar.
8903	98.98	do.....	do.
8900	97.98	do.....	do.
9295	98.93	do.....	do.
8509	98.98	do.....	do.
8899	98.98	do.....	do.
9294	99.50	do.....	do.
8902	98.98	do.....	do.
8475	98.00	do.....	do.
8600	98.00	do.....	do.
8901	98.24	do.....	do.
8476	98.00	do.....	do.
8599	98.00	do.....	do.
9296	98.93	do.....	do.
8478	98.50	do.....	do.
8477	98.00	do.....	do.
8904	97.98	do.....	do.

food is just as much an imposition on the purchaser and a violation of the Food Law as any other form of adulteration, and examination of such products on sale in the State will be made from time to time. Violations of this kind if detected will be prosecuted. Therefore, dealers are warned to see that such products, when offered for sale, are in good condition.

Eleven samples of these goods were examined during July and August and all were found to be in bad condition, containing worms and were worm-eaten to the extent that they were entirely unfit for human food.

RESULTS OF THE EXAMINATION OF DRIED

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9264 Currants.....			Williams & Gathings, Monroe.....
9267 Currants.....			W. J. Glass, Concord.....
9268 Currants.....			Theo. Atwell, Salisbury.....
9266 Currants.....			J. F. Jamison, Charlotte.....
9262 Currants.....			J. B. Bass, Monroe.....
9271 Currants.....			Tussey & Koonts, Lexington....
9265 Dates.....			C. M. Bridgers, Charlotte.....
9263 Dates.....			J. B. Bass, Monroe.....
9269 Dates.....			Tussey & Koonts, Lexington....
9261 Raisins.....			J. T. Redfern, Wadesboro.....
9270 .....do.....			Tussey & Koonts, Lexington....

EXTRACTS—BANANA, IMITATION.

It being impractical to make a true banana extract there is no standard for it. So-called banana extracts are synthetic or artificial products and should be labeled imitation banana extract, or imitation banana

RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9370 Banana Extract.....		Goldsboro Drug Co., Goldsboro, N. C.	Goldsboro Drug Co.....
9099 .....do.....		Strother Drug Co., Lynchburg, Va.	L. H. Caldwell, Lumberton.....
9168 Banana Extract, Imitation		Winston Drug Co., Winston-Salem, N. C.	J. T. Pinkston, Wadesboro.....
9204 Banana Extract*.....		Heekin Spice Co., Cincinnati, Ohio	Chas. E. Pugh, Greensboro.....

* Sample from old stock.

EXTRACTS LEMON AND EXTRACT LEMON SUBSTITUTES.

Lemon extract is the flavoring extract prepared from oil of lemon, or from lemon peel, or both, and contains not less than 5 per cent by volume of oil of lemon.

Oil of lemon is the volatile oil obtained from the fresh peel of the lemon.

The cost of the alcohol in a lemon extract is about four-fifths of the total cost of a good extract. That being the case, the manufacturer

FRUITS—CURRANTS, DATES AND RAISINS.

Laboratory Number	Remarks and Conclusions
9264	Currants, on account of worms were unfit for food; sale illegal.
9267	do.
9268	do.
9266	do.
9262	do.
9271	Currants, on account of worms were unfit for food; package did not show name of manufacturer or jobber; sale illegal.
9265	Dates, on account of worms were unfit for food; sale illegal.
9263	do.
9269	Dates, on account of worms were unfit for food; did not show name and address of manufacturer or jobber; sale illegal.
9261	Raisins, on account of worms were unfit for food; sale illegal.
9270	do.

flavor. Of these, four samples were examined, three of which were labeled "banana extract," and being synthetic or artificial products were misbranded.

OF IMITATION BANANA EXTRACT.

Laboratory Number	Results of Analysis	Remarks and Conclusions
9370	Synthetic product.	Imitation extract banana, misbranded; the label is generally misleading and deceptive; sale illegal.
9099	do.	Imitation banana extract, misbranded; statements on carton as to it being a synthetic product conflicting; sale illegal
9168	do.	Imitation banana extract.
9204	do.	Imitation extract banana; misbranded; sale illegal.

naturally seeks to reduce the amount of alcohol used; but lemon oil, being almost insoluble in weak alcohol, to reduce the strength of the latter necessarily reduces the amount of lemon oil present or in solution.

Extracts are often adulterated by the addition of such substances as citral, oil of citronella and oil of lemon grass.

These products are usually labeled compound, and dealers often insist that the compound is just as good or practically as good as the real extract, and consumers are induced to buy them at the same or near

the price of the real extract. Consumers are hereby cautioned against the purchase of compounds, imitations, etc., for which they are paying the price of a first-class article.

One hundred and fourteen lemon extracts and substitutes for the same were examined, forty-five of which or 39.65 per cent proved to be adulterated or misbranded. A few of these products are made of good materials, and are all right except they are slightly below standard, containing less than 5 per cent of lemon oil, while others labeled pure extract of lemon contained no lemon oil at all, but were made from citral, etc.

Some manufacturers have tried to evade the law by labeling their products "Flavoring," "Essence," etc. The courts have held that these expressions, when placed on the label of flavoring material, convey to

RESULTS OF THE EXAMINATION OF LEMON

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9082	Lemon Extract.....	Ahrens Bros., Wilmington, N. C.	Geo. H. Heyer, Wilmington.....
9081	do.....	do.....	J. D. Burnett & Bro., Wilmington.
9170	Lemon Extract, Republic..	Austin-Nichols & Co., New York, N. Y.	J. T. Pinkston, Wadesboro.....
9080	Lemon Extract*.....	do.....	Wilmington Grocery Co., Wilmington
9040	Lemon Extract, Republic..	do.....	Liles, Ruffin & Co., Tarboro...
9041	Lemon Extract, Republic..	do.....	C. B. Keech & Co., Tarboro.....
8843	do.....	do.....	Liles, Ruffin & Co., Tarboro.....
9023	do.....	do.....	do.....
9052	do.....	do.....	do.....
9042	Lemon Extract, Sunbeam..	do.....	C. B. Keech & Co., Tarboro.....
8855	Lemon Flavoring, Bailey's Dime	Bailey, James & Son, Baltimore,	Branning Mfg. Co., Edenton....
8629	Lemon Extract*.....	Blanke-Baer Chemical Co., St. Louis, Mo.	T. M. Stephens & Co., Durham..
9085	Lemon Extract,* Bastine's	Bastine & Co., New York, N. Y.	S. W. Sanders & Co., Wilmington
9092	Lemon Extract.....	Bellamy, Robt. R., Wilmington, N. C.	J. B. Fales, Wilmington
9088	do.....	do.....	J. A. Westbrook, Wilmington....
8453	do.....	do.....	Bobblitt-Wynne Drug Co., Raleigh.
8472	do.....	Burnett, Jos. & Co., Boston, Mass.	H. J. Johnson, Raleigh.....
8473	do.....	do.....	Rosenthal & Co., Raleigh.....
9180	Lemon Flavorf.....	Burwell-Dunn Co., Charlotte.....	A. O. Oettinger, Charlotte.....
8841	Lemon Extract, Keeler's...	Carr-Owens & Co., Baltimore, Md.	Tarboro Grocery Co., Tarboro..
8627	Lemon Substitute.....	Chandler Produce Co., Durham, N. C.	Johnson & Hewitt, Durham.....
9196	Lemon Extract, Mammy's Favorite	Christian Bros., & Co. Richmond, Va.	W. H. Moffitt, Lexington.....
8839	Imitation Lemon Flavor..	Clotworthy Chemical Co., Baltimore, Md.	J. L. Matthews, Wilson.....
9094	Lemon Extract, Mayflower	Colburn, A. Co., Philadelphia, Pa.	H. D. Oldenbottle, Wilmington..

*Sample from old stock.

† Manufactured to comply with Drug Standard.

the average person the same meaning as the word extract, and are therefore synonymous terms with the word "extract."

Lemon extracts are used to flavor both foods and medicines. If sold as a drug it would have to comply only with the drug standard, but if sold for food purposes it must comply with the food standards, which are higher than the drug standard. As a drug it is not misbranded if the amount of lemon oil present is stated on the label. As a food it must contain at least 5 per cent of lemon oil.

A few of the samples examined were manufactured according to the drug standard and were sold in good faith by manufacturers, but were sold by dealers for food purposes and were therefore sold in violation of the law. (See foot notes.)

EXTRACTS AND LEMON EXTRACT SUBSTITUTES.

Laboratory Number	Lemon Oil by Polarization— Per Cent by Volume	Lemon Oil— Mitchell's Method— Per Cent by Volume	Reading Refractometer, 30°C.	Refractive Index	Remarks and Conclusions
9082	5.00	5.00	64.50	1.4688	Lemon extract.
9081	5.00	5.00	65.00	1.4691	do.
9170	4.31	4.20	66.00	1.4697	Lemon extract, below standard; sale illegal.
9080	5.69	5.70	63.00	1.4678	Lemon extract, below standard, misbranded. Statement "best triple strength" misleading and deceptive; sale illegal.
9040	3.31	3.20	-----	-----	Lemon extract, below standard; sale illegal.
9041	5.81	5.70	-----	-----	Lemon extract.
8843	-----	2.80	67.00	1.4697	Lemon extract, below standard; sale illegal.
9023	3.31	3.20	-----	-----	do.
9052	3.31	-----	-----	-----	do.
9042	7.19	-----	-----	-----	Lemon extract.
8855	-----	4.80	66.50	1.4700	Lemon extract, slightly below standard; sale illegal.
8629	0.00	0.00	-----	-----	Imitation lemon extract, contains no oil of lemon; sale illegal.
9085	-----	4.40	64.50	1.4688	Lemon extract below standard; sale illegal.
9092	6.69	6.60	65.00	1.4691	Lemon extract.
9088	6.82	7.00	65.00	1.4691	do.
8453	-----	5.00	67.00	1.4704	do.
8472	-----	10.40	67.00	1.4704	Lemon extract, extra strength.
8473	-----	10.30	67.00	1.4704	do.
9180	2.81	2.80	64.00	1.4685	Lemon extract below standard; sale illegal.
8841	-----	5.20	66.50	1.4700	Lemon extract.
8627	0.00	0.00	-----	-----	Imitation lemon extract.
9196	1.28	1.30	64.00	1.4685	Lemon extract below standard; sale illegal.
8839	Trace.	-----	-----	-----	Imitation lemon flavor.
9094	5.52	5.40	65.50	1.4694	Lemon extract.

RESULTS OF THE EXAMINATION OF LEMON EXTRACTS

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9083	Lemon Extract.....	Colgate & Co., New York, N. Y.	S. W. Sanders, Wilmington.....
9179	Lemon Flavor, Costen's.....	Costen, W. A., & Co., Pocomoke City, Md.	A. O. Oettinger, Charlotte.....
8576	Lemon Extract.....	Crawford, W. H., & Co., Balti- more, Md.	Davis & Sons, Henderson.....
9176	Lemon Extract, Royal Windsor	Cumberland Mfg. Co., Nashville, Tenn.	Campbell & Morriss, Charlotte..
8501	Lemon Extract, Helmet.....	Durkee, E. R., & Co., New York, N. Y.	Peoples Supply Co., Wilmington
9161	Imitation Lemon Flavor.....	Fenner, M. M., Co., Fredonia, N. Y.	MacRae Mercantile Co., Wades- boro.
8858	Extract Lemon, Fonerden's	Fonerden, C. A., & Co., Baltimore, Md.	J. L. Hassell & Co., Williamston.
9084	Lemon Extract, New Method*	Fonerden Specialty Co., Baltimore	S. W. Sanders, Wilmington.....
8851	Extract Lemon, Golden Horse Shoe	Four, The, Co., Norfolk, Va.....	Latham-Owens Co., Plymouth
8856	.....do.....	.....do.....	W. S. White, Edenton.....
8424	Lemon Extract, Dove.....	Frank Tea and Spice Co., Cincin- nati, Ohio.	R. C. Batchelor, Raleigh.....
8585	.....do.....	.....do.....	Perry-Wood Co., Durham.....
8844	Lemon Extract.....	Gilbert Bros., & Co., Baltimore, Md.	C. B. Keech & Co., Tarboro.....
9375	.....do.....	Goldshoro Drug Co., Goldshoro, N. C.	Golds. Drug Co., Goldshoro....
9376	Imitation Lemon Extract.....	.....do.....	.....do.....
8860	Lemon Extract.....	Goldshoro Drug Co., Goldshoro, N. C.	J. A. Bowen, Scotland Neck.....
9200	Lemon Extract, A. & P.	Great Atlantic and Pacific Tea Co., Jersey City, N. J.	Great Atlantic and Pacific Tea Co., Greensboro
8582	Lemon Extract.....	Greever-Lotspeich Co., Knoxville, Tenn.	Allens Grocery Co., Oxford.....
8581	.....do.....	.....do.....	Breedlove & McFarland, Oxford
8443	Lemon Extract, Electa.....	Hall, H. R., Co., Chicago, Ill.....	W. B. Mann & Co., Raleigh....
8429	Lemon Extract*.....	Heekin Spice Co., Cincinnati, Ohio	W. R. Dorsett & Co., Raleigh..
8584	Lemon Extract, White Cap*	.....do.....	Perry-Wood Co., Durham.....
8626	Lemon Substitute, White Cap	.....do.....	I. A. Burnett & Son, Durham.
8878	Extract Lemon, White Cap	.....do.....	J. C. Spruill, Plymouth.....
8850	Lemon Flavor*.....	.....do.....	Pamlico Grocery Co., Washing- ton.
9086	.....do.....	Heyer Bros., Wilmington, N. C.	J. H. Brunjes, Wilmington.....
8575	.....do.....	Hite, S. P., Roanoke, Va.....	Davis & Sons, Henderson.....
8578	.....do.....	.....do.....	J. H. Edwards, Henderson....
9096	Lemon Extract, Helmet.....	Holmes Grocery Co., Wilmington, N. C.	J. S. Westbrook, Wilmington..
8632	Lemon Extract, Kitchen Queen	Interstate Chemical Co., Baltimore, Md.	C. E. Jourdan, Durham.....
8624	.....do.....	.....do.....	F. M. Carlton, Durham.....
8638	.....do.....	.....do.....	F. G. Ligon, East Durham..
8640	.....do.....	.....do.....	J. E. Timberlake, Durham.....
8842	.....do.....	.....do.....	Liles, Ruffin & Co., Tarboro....
9195	.....do.....	Interstate Commerce Co., Rich- mond, Va.	Robt. L. Leonard, Lexington....
8845	Lemon Extract, Terpenless	Kent Drug Co., Baltimore, Md.	Jno. Williams, Greenville.....
8846	.....do.....	.....do.....	.....do.....

* Sample from old stock.

AND LEMON EXTRACT SUBSTITUTES—*Continued.*

Laboratory Number	Lemon Oil by Polarization— Per Cent by Volume	Lemon Oil— Mitchell's Method— Per Cent by Volume	Reading Refractometer, 30°C.	Refractive Index	Remarks and Conclusions
9083	8.62	8.60	64.00	1.4685	Lemon extract
9179	8.78	8.80	65.00	1.4691	do.
8576	-----	5.45	65.00	1.4691	do.
9176	5.56	5.40	65.00	1.4691	do.
8501	-----	4.90	-----	-----	Lemon extract, slightly below standard; does not show name and address of manufacturer.
9161	2.56	2.60	65.00	1.4691	Imitation lemon extract, or lemon extract below standard
8858	-----	6.30	67.00	1.4704	Lemon extract.
9084	0.21	Trace	-----	-----	Imitation lemon extract, misbranded; sale illegal.
8851	-----	5.30	66.50	1.4700	Lemon extract.
8856	-----	5.20	67.00	1.4704	do.
8424	-----	5.40	64.00	1.4685	do.
8585	-----	5.40	65.00	1.4691	do.
8844	-----	6.40	66.50	1.4700	do.
9375	5.16	5.00	66.50	1.4700	do.
9376	0.00	0.00	-----	-----	Imitation lemon extract.
8860	-----	0.00	-----	-----	Imitation lemon extract, misbranded; sale illegal.
9200	5.03	5.00	65.70	1.4694	Lemon extract.
8582	-----	13.20	65.00	1.4691	Lemon extract, extra strength.
8581	-----	13.20	65.00	1.4691	do.
8443	-----	9.20	66.00	1.4697	do.
8429	-----	1.70	68.00	1.4710	Lemon extract, below standard; sale illegal.
8584	-----	0.00	-----	-----	Imitation lemon extract, misbranded; sale illegal.
8626	-----	0.00	-----	-----	Imitation lemon extract.
8878	-----	5.30	66.00	1.4697	Lemon extract.
8850	-----	Trace	-----	-----	Imitation lemon extract, misbranded; sale illegal.
9086	4.75	4.80	-----	-----	Lemon extract slightly below standard, not properly labeled; sale illegal.
8575	-----	5.00	-----	-----	Lemon extract.
8578	-----	4.85	65.50	1.4694	Lemon extract slightly below standard.
9096	5.06	5.00	64.50	1.4688	Lemon extract.
8632	-----	5.20	64.50	1.4688	do.
8624	-----	4.60	64.00	1.4685	Lemon extract below standard; sale illegal.
8638	-----	5.10	64.00	1.4685	Lemon extract.
8640	-----	5.00	64.00	1.4685	do.
8842	-----	5.40	67.00	1.4704	Lemon extract, should not be labeled "lemon," but "lemon extract," not properly labeled.
9195	4.60	4.60	66.40	1.4698	Lemon extract below standard; sale illegal.
8845	-----	Trace	-----	-----	Imitation lemon extract.
8846	-----	do	-----	-----	do.

RESULTS OF THE EXAMINATION OF LEMON EXTRACTS

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8426	Lemon Extract.....	King, O. G., & Co., Raleigh, N. C.	O. G. King, Raleigh.....
8451	do.....	King, W. H., Drug Co., Raleigh, N. C.	W. H. King Drug Co., Raleigh..
8879	do.....	Lee & Herring, Clinton, N. C.	A. W. Aman, Clinton.....
9160	Lemon Extract.....	do.....	E. D. Whitlock, Rockingham....
9187	Lemon Extract, Nabob*....	Leggett, Francis H., New York, N. Y.	W. R. Woodson, Salisbury.....
8854	Lemon Extract, Perfection	Loewy Drug Co., Baltimore, Md.	J. F. Bishop, Plymouth.....
9185	Lemon Flavor.....	Marsh, M. L., Concord, N. C.	W. J. Glass, Concord.....
8425	Lemon Extract.....	Martin Street Pharmacy, Raleigh, N. C.	Martin Street Pharmacy Raleigh
8836	Extract Lemon, Clover....	McCormick & Co., Baltimore, Md.	W. J. Taylor, Wilson.....
9181	Lemon Extract, McIlhenny's	McIlhenny, E., Co., New Iberia, La.	L. L. Sarratt, Charlotte.....
8433	Lemon Extract.....	McManagle & Rogers, Middletown, N. Y.	H. J. Johnson, Raleigh.....
9157	Lemon Extract, Columbia	Murry, The, Drug Co., Columbia, S. C.	H. O. Covington, Laurinburg...
8639	Lemon Extract, Red Seal..	Newton Tea and Spice Co., Cincinnati, Ohio.	T. H. Alford, East Durham.....
9171	do.....	do.....	L. N. Pressen & Co., Monroe....
8625	do.....	do.....	F. M. Carlton, Durham.....
8840	do.....	do.....	J. W. Davenport, Rocky Mount..
8583	do.....	do.....	J. T. Sizemore, Oxford.....
8574	Lemon Extract.....	do.....	A. A. Bullock, Henderson.....
8428	Lemon Extract, Red Seal....	do.....	J. F. Cain & Son, Raleigh.....
9190	Lemon Extract, N. P. D....	Norman-Perry Drug Co., Winston-Salem, N. C.	A. L. Sink, Lexington.....
9050	Lemon Extract.....	do.....	Hancock Grocery Co., Winston-Salem.
9164	do.....	Parsons Drug Co., Wadesboro, N. C.	J. E. C. Hill, Wadesboro.....
9163	do.....	Pee Dee Pharmacy, Wadesboro, N. C.	do.....
9172	Lemon Extract, Dr. Price's	Price Flavoring Extract Co., New York, N. Y.	Bruner & Huey, Monroe.....
9201	Lemon Extract, Souders' XX.	Royal Remedy and Extract Co., Dayton, Ohio.	C. Scott & Co., Greensboro.....
9165	Lemon Extract.....	Sampson Medicine Co., Winston-Salem, N. C.	V. F. Tarleton, Wadesboro.....
9198	Lemon Extract, Best by Test.	do.....	City Bakery, High Point.....
9197	do.....	do.....	McClure & Perryman, High Point
9193	do.....	do.....	A. L. Sink, Lexington.....
8423	Lemon Extract, Sauer's....	Sauer, C. F., Co., Richmond, Va.	C. C. Jones, Raleigh.....
9097	Lemon Extract.....	Scott, Jno. M., & Co., Charlotte, N. C.	J. H. Wishart, Lumberton.....
9102	Lemon Flavor.....	Smith, Dr. T. C., Druggist, Asheville, N. C.	Dr. T. C. Smith, Asheville.....
8853	Essence Lemon, Standard†.	Standard Drug Co., Elizabeth City, N. C.	U. W. Tarkington, Bellhaven.....
8857	do†.....	do.....	J. M. LeRoy, Elizabeth City, N. C.
8862	Extract Lemon, Purl.....	Suffolk Drug and Extract Co., Suffolk, Va.	W. J. Kimball, Enfield.....
8439	Lemon Extract*.....	Thomas Extract Co., New York, N. Y.	Rosenthal & Co., Raleigh.....

* Sample from old stock.

† Manufactured to comply with drug standard.

AND LEMON EXTRACT SUBSTITUTES—*Continued.*

Laboratory Number	Lemon Oil by Polarization— Per Cent by Volume	Lemon Oil— Mitchell's Method— Per Cent by Volume	Reading Refractometer, 30°C.	Refractive Index	Remarks and Conclusions
8426		4.80	67.00	1.4704	Lemon extract below standard; sale illegal.
8451		6.00	66.00	1.4697	Lemon extract.
8879		8.80	67.00	1.4704	do.
9160	1.19	1.00	70.00	1.4723	Lemon extract below standard; sale illegal.
9187	4.40	4.50	65.60	1.4695	do.
8854		5.00	66.50	1.4670	Lemon extract.
9185	1.40	1.50			Lemon extract below standard; sale illegal.
8425		17.40	67.00	1.4704	Lemon extract of extra strength.
8836		5.20	67.10	1.4704	Lemon extract.
9181	6.25	6.00	65.00	1.4691	do.
8433		6.45	66.00	1.4697	do.
9157	4.06	4.20	64.00	1.4685	Lemon extract below standard; sale illegal.
8639		4.70	64.00	1.4685	Lemon extract below standard; sale illegal.
9171	5.90	5.80	65.00	1.4691	Lemon extract.
8625	4.37	4.30	64.00	1.4685	Lemon extract below standard; sale illegal.
8840		5.20	67.50	1.4704	Lemon extract.
8583		4.60	65.00	1.4691	Lemon extract below standard; sale illegal.
8574		4.60	65.00	1.4691	do.
8428		5.35	65.00	1.4691	Lemon extract.
9190	5.28	5.20	65.40	1.4693	do.
9050	4.97	5.00			do.
9164	5.94	6.00	64.00	1.4685	do.
9163	5.75	5.40	65.00	1.4691	do.
9117	6.66	6.60	65.80	1.4696	do.
9201	5.25	5.00	64.60	1.4689	do.
9165	2.84	3.00	65.00	1.4691	Lemon extract below standard, misbranded. Statement on label "best by test" misleading; sale illegal.
9198	Trace				Imitation lemon extract, misbranded. Statement "best by test" untrue and misleading; sale illegal.
9197	6.09	6.20	65.40	1.4693	Lemon extract.
9193	5.62	5.60	65.40	1.4693	Lemon extract, labeled "substitute lemon," but is a legal lemon extract.
8423		5.35	65.00	1.4691	Lemon extract.
9097	5.25	5.30	65.00	1.4691	do.
9102	Trace	Trace			Imitation lemon extract, misbranded. Lemon flavor and lemon extract are synonymous. Sale illegal.
8853	3.20		69.50	1.4720	Imitation lemon extract, misbranded. The composition printed in very small type admits that it is below standard; sale illegal.
8857	2.70		66.50	1.4700	do.
8862	0.00	0.00			Imitation lemon extract, misbranded; sale illegal.
8439	0.00	0.00			do.

RESULTS OF THE EXAMINATION OF LEMON EXTRACTS

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8452	Lemon Extract.....	Tucker Building Pharmacy, Raleigh.	Tucker Building Pharmacy, Raleigh.
8580	Lemon Extract, Our Seal..	Vaughn-Crutchfield Co., Winston- Salem, N. C.	L. F. Day, Oxford.....
8837	do.....	do.....	J. D. Lee, Wilson.....
9186	do.....	do.....	D. M. Miller & Son, Salisbury....
8579	do.....	do.....	J. H. Edwards, Henderson.....
8577	do.....	do.....	Geo. E. Perry, Henderson.....
8628	do.....	do.....	T. M. Stephens, Durham
9037	do.....	do.....	Vaughn-Crutchfield Co., Winston- Salem.
8994	do.....	do.....	do.....
8631	Lemon Extract.....	Williams, R. C., & Co., New York, N. Y.	C. E. Jourdan, Durham.....
8838	Lemon Extract, Triple Strength.*	Williar, Chas. E., Baltimore, Md ..	J. D. Lee, Wilson.....
9051	Lemon Extract, Pilot.....	Winston Drug Co., Winston- Salem, N. C.	Winston Drug Co., Winston- Salem.
9167	do.....	do.....	J. T. Pinkston, Wadesboro
8485	do.....	do.....	S. W. Garner, Crutchfield..
9166	Lemon Extract, Crescent†..	do.....	Morrison Bros., Wadesboro.....
8440	Lemon Substitute.....	do.....	Rosenthal & Co., Raleigh.....
8849	Imitation Lemon Flavoring	do.....	Jos. F. Tayloe, Washington.....

* Sample from old stock.

EXTRACT ORANGE.

Orange extract is the flavoring extract prepared from oil of orange, or from orange peel, or both, and contains not less than 5 per cent by volume of oil of orange. Oil of orange is the volatile oil obtained from the fresh peel of the orange.

RESULTS OF THE EXAMINATION OF ORANGE

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9156	Orange Extract.....	Bristol Drug Mfg. Co., Bristol, Va.	R. B. Terry, Hamlet.....
8861	Extract Orange, C.C.C.....	Clotworthy Chemical Co., Balti- more, Md.	Cash Grocery Co., Scotland Neck.
9178	Orange Flavor, Costen's ..	Costen, W. A., Co., Pocomoke City, Md.	A. E. Oettinger, Charlotte....
9100	Orange Extract, Eagle.....	Eagle Mills Co., Nashville, Tenn....	J. L. Tatum, Fayetteville....
9173	Orange Extract.....	English Drug Co., Monroe, N. C....	M. Waller, Monroe.....
9188	Orange Extract, Household	Gilbert Bros. & Co., Baltimore, Md.	W. R. Woodson, Salisbury....

AND LEMON EXTRACT SUBSTITUTES—*Continued.*

Laboratory Number	Lemon Oil by Polarization—Per Cent by Volume	Lemon Oil—Mitchell's Method—Per Cent by Volume	Reading Refractometer, 30°C.	Refractive Index	Remarks and Conclusions
8452		5.60	67.00	1.4701	Lemon extract.
8580		5.00	65.00	1.4691	do.
8837		3.60	65.90	1.4696	Lemon extract below standard; sale illegal.
9186	4.06	4.00	65.60	1.4695	do.
8579		5.00	66.00	1.4697	Lemon extract.
8577		4.60	65.00	1.4691	Lemon extract below standard; sale illegal
8628		4.40	65.00	1.4691	do.
9037	5.68	5.60			Lemon extract.
8994		4.98			Lemon extract slightly below standard.
8631		6.60	65.00	1.4691	Lemon extract.
8838		6.80	65.60	1.4695	Lemon extract misbranded, it is not triple extract as advertised on carton; sale illegal.
9051	Trace	Trace			Imitation lemon extract, misbranded; sale illegal.
9167	0.25	0.30			do.
8485		0.30			do.
9166	0.00	0.00			Imitation lemon extract, misbranded. Label says "concentrated extract lemon," oil lemon, 2 per cent. Sale illegal.
8440	0.00	0.00			Imitation lemon flavor. Not properly labeled.
8849		0.00			Imitation lemon flavoring, misbranded. It claims to contain lemon oil, is also not properly labeled; sale illegal.

Orange extracts are subject to the same adulteration and misbranding as lemon extracts. (See lemon extracts in this report.)

Under the head of orange extracts nineteen samples were examined, seven, or 36.84 per cent of which appeared to be adulterated or misbranded, some of them being labeled orange extract that contained no oil of orange at all. (See table below.)

EXTRACTS AND ORANGE EXTRACT SUBSTITUTES.

Laboratory Number	Orange Oil by Polarization—Per Cent by Volume	Orange Oil—Mitchell's Method—Per Cent by Volume	Reading Refractometer, 30°C.	Refractive Index	Remarks and Conclusions
9156	Trace	Trace			Imitation orange extract, misbranded; sale illegal.
8861		5.60	63.00	1.4678	Orange extract.
9178	6.07	6.20	63.10	1.4677	do.
9100	0.00	0.00			Imitation orange extract, misbranded; sale illegal.
9173	2.24	2.40	63.50	1.4681	Orange extract below standard; sale illegal.
9188	5.56	5.60	63.80	1.4684	Orange extract.

RESULTS OF THE EXAMINATION OF ORANGE

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9371	Extract Orange	Goldsboro Drug Co., Goldsboro, N. C.	Goldsboro Drug Co., Goldsboro
8446	do	Hall, H. R., Co., Chicago, Ill.	W. B. Mann & Co., Raleigh.....
9177	do	Hand, W. L., & Co., Charlotte, N. C.	W. M. Burkhead, Charlotte.....
8852	Orange Flavor, White Cap.	Heekin Spice Co., Cincinnati, Ohio	J. C. Spruill, Plymouth
8630	do*	do	T. M. Stephens & Co., Durham..
8847	Orange Extract, Terpenless.	Kent Drug Co., Baltimore, Md.....	Jno. Williams, Greenville.....
8848	Orange Extract, Perfection.	Loewy Drug Co., Baltimore, Md...	Walter Credle Co., Washington..
8653	Orange Extract, Bee	McCormick & Co., Baltimore, Md..	H. C. Watson, Rockingham.....
8435	Orange Extract	McMonagle & Rogers, Middletown, N. Y.	H. J. Johnson, Raleigh.....
9162	do	Pee Dee Pharmacy, Wadesboro, N. C.	J. E. C. Hill, Wadesboro.....
9158	do	Scott, J. M., & Co., Charlotte, N. C.	Lackey Bros., Hamlet.....
9098	do	Strother Drug Co., Lynchburg, Va.	L. H. Caldwell, Lumberton.....
9191	Orange Extract, Seal.	Vaughn-Crutchfield Drug Co., Winston-Salem, N. C.	A. L. Sink, Lexington

* Sample from old stock.

EXTRACT—IMITATION PEACH.

As the manufacture of a true peach extract is impractical there is no standard for this class of products. So-called peach extracts are syn-

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9203	Peach Extract, Princess*....	Bennett, Sloan & Co., New York, N. Y.	Chas. E. Pugh, Greensboro.....
9202	Peach Extract, White Cap*.	Heekin Spice Co., Cincinnati, Ohio.	do.
9109	Peach Extract*	Neutralgine Chemical Co., Wilmington, N. C.	J. B. Buckingham, Fayetteville..

* Sample from old stock.

EXTRACT PEPPERMINT AND SUBSTITUTES FOR SAME.

Peppermint extract is the flavoring extract prepared from oil of peppermint, or from peppermint, or both, and contains not less than 3 per cent. by volume of oil of peppermint. Oil of peppermint is the volatile oil obtained from peppermint.

EXTRACTS AND ORANGE EXTRACT SUBSTITUTES—*Continued.*

Laboratory Number	Orange Oil by Polarization— Per Cent by Volume	Orange Oil— Mitchell's Method— Per Cent by Volume	Reading Refractometer, 30° C.	Refractive Index	Remarks and Conclusions
9371	0.00	0.00	.....	.....	Imitation extract of orange, misbranded; sale illegal.
8446	.....	5.40	63.00	1.4678	Orange extract.
9177	0.00	0.00	.....	.....	Imitation orange extract, misbranded; sale illegal.
8852	.....	5.20	64.00	1.4685	Orange extract.
8630	.....	0.00	.....	.....	Imitation orange extract, misbranded; sale illegal.
8847	.....	0.00	.....	.....	Imitation orange extract.
8848	.....	5.50	66.20	1.4697	Orange extract.
8653	.....	6.60	63.00	1.4678	do.
8435	.....	5.60	63.00	1.4678	do.
9162	5.00	5.40	65.80	1.4696	do.
9158	6.00	6.10	63.00	1.4678	do.
9098	4.72	4.90	61.50	1.4668	Orange extract slightly below standard; sale illegal.
9191	.....	5.00	61.80	1.4671	Orange extract.

thetic or artificial products and should be labeled imitation extracts or imitation flavors. Three of these products were examined, all of which were branded peach extracts, and being synthetic products, were misbranded.

IMITATION PEACH EXTRACTS.

Laboratory Number	Analysis	Remarks and Conclusions
9203	Synthetic flavor.....	Imitation peach flavor, misbranded; sale illegal.
9202	.....do.....	do.
9109	.....do.....	do.

Seven samples under this head were examined, four of which were adulterated or misbranded; three of the four being extracts of peppermint below standard, and one being an imitation extract. No. 9369 was also an imitation extract but it was so labeled and was, therefore, not misbranded.

RESULTS OF THE EXAMINATION OF PEPPER-

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9380	Extract of Peppermint.....	Goldsboro Drug Co., Goldsboro, N. C.	Goldsboro Drug Co., Goldsboro.
9369	Extract of Peppermint, Imitation.	do.....	do.
9175	Extract of Peppermint	Kangra Valley Tea Co., Atlanta, Ga.	S. B. McLaughlin, Charlotte.....
9184	do.....	Sampson Medicine Co., Winston- Salem, N. C.	W. G. Glass, Concord.....
9101	do.....	Scott, J. M., & Co., Charlotte, N. C.	J. H. Wishart, Lumberton.....
9105	Peppermint Flavor.....	Smith, Dr. T. C., druggist, Ashe- ville, N. C.	Dr. T. C. Smith, druggist, Ashe- ville.
9194	Essence Peppermint, Old Homestead.	Southern Drug Co., Norfolk, Va.	Tussey & Koonts, Lexington....

EXTRACT PINEAPPLE, IMITATION.

These products being imitations there is no standard for them. So-called pineapple extracts are synthetic or artificial products and should be labeled imitation pineapple extract, or imitation pineapple flavor.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9110	Extract of Pineapple.....	Burwell & Dunn Co., Charlotte, N. C.	J. L. Tatum, Fayetteville.....
9372	Extract of Pineapple, Imitation.	Goldsboro Drug Co., Goldsboro, N. C.	Goldsboro Drug Co., Goldsboro.
9192	Extract of Pineapple, Artificial.	Norman-Perry Drug Co., Winston- Salem, N. C.	A. L. Sink, Lexington.....
9189	Essence Pineapple.....	Sampson Medicine Co., Winston- Salem, N. C.	A. L. Sink, Lexington.....
9183	do.....	do.....	W. J. Glass, Concord

EXTRACT STRAWBERRY, IMITATION.

These products being imitation there is no standard for them. So-called strawberry extracts are synthetic or artificial products and should be labeled imitation strawberry extract or imitation strawberry flavor.

MINT EXTRACTS AND SUBSTITUTES FOR SAME.

Laboratory Number	Peppermint Oil—Mitchell's Method— Per Cent by Volume	Reading Refracto- meter	Refractive Index	Remarks and Conclusions
9380	9.60	45.00	1.4562	Extract of peppermint.
9369	0.00	.....	.....	Imitation extract of peppermint.
9175	1.20	.....	.....	Extract of peppermint below standard; sale illegal
9184	2.40	49.00	1.4586	do.
9101	11.60	.....	.....	Extract of peppermint.
9105	0.00	.....	.....	Imitation extract of peppermint, misbranded; sale illegal
9194	1.20	.....	.....	Extract of peppermint, below standard; sale illegal.

Seven samples of imitation pineapple flavors were examined, all of which were misbranded except one, No. 9192, which was labeled artificial extract pineapple.

IMITATION PINEAPPLE EXTRACTS.

Laboratory Number	Analysis	Remarks and Conclusions
9110	Synthetic flavor.....	Imitation pineapple extract, misbranded; sale illegal.
9372	do.....	Imitation pineapple extract.
9192	do.....	do.
9189	do.....	Imitation pineapple flavor, misbranded; sale illegal
9183	do.....	do.

Under this head seven samples were examined, all of which were misbranded except one, No. 9378, which was labeled imitation strawberry extract. They were all synthetic or artificial products and should be labeled imitation extracts or flavors.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9169	Strawberry Extract.....	Crown Chemical Co., Baltimore, Md.	J. T. Pinkston, Wadesboro.....
9159	Strawberry Extract, Eagle	Eagle Mills Co., Nashville, Tenn..	Lackey Bros., Hamlet.....
9373	Strawberry Extract, Imita- tion.	Goldsboro Drug Co., Goldsboro, N. C.	Goldsboro Drug Co., Goldsboro
9205	Strawberry Extract, Gold Arrow.*	Newton Tea and Spice Co., Cinein- nati, Ohio.	Chas. E. Pugh, Greensboro.....
9378	Imitation Strawberry Ex- tract.	Goldsboro Drug Co., Goldsboro, N. C.	Goldsboro Drug Co., Goldsboro
9182	Strawberry Extract.....	Sampson Medicine Co., Winston- Salem, N. C.	W. J. Glass, Concord
9104	Strawberry Flavor.....	Smith, Dr. T. C., druggist, Ashe- ville, N. C.	T. C. Smith, druggist, Asheville..*

*Sample from old stock.

FLOUR.

Flour is the fine, clean, sound product made by bolting wheat meal and contains not more than 13.5 per cent of moisture, not less than 1.25 per cent of nitrogen, not more than 1 per cent of ash, and not more than 0.50 per cent of fiber.

On this very important subject the following is quoted from the Report of this Department for 1910:

"Very little adulteration is found in flour, except the bleaching of it by the use of *nitrogen peroxide*, a *poisonous gas*. A food product is adulterated: If it be mixed, colored, bleached, powdered, coated or stained in a manner whereby damage or inferiority is concealed, or if it contains any added poisonous or other added deleterious ingredient which may render such article injurious to health.

"Investigations have shown that in the bleaching of flour by the Alsop process both classes of adulteration exist. The bleaching agent, nitrogen peroxide, is a poisonous substance and is left in the flour after the bleaching is completed. By bleaching, low grade flours are made to appear like high grade products, the appearance of them being improved without improving their quality. The Alsop Process Company, which owns the patent right for the bleaching process, has made the greatest effort possible to prevent food officials from enforcing the law against the bleaching of flour. They have employed, at tremendous cost, the very best scientific and legal talent that is to be had in this country, but the officials have so far won in every case tried, the most important of which is the one known as the Kansas City case. It was

IMITATION STRAWBERRY EXTRACTS.

Laboratory Number	Analysis	Remarks and Conclusions
9169 Synthetic flavor.		Imitation strawberry extract, misbranded; sale illegal
9159 . . . do		do.
9373 . . . do		Imitation strawberry extract.
9205 . . . do		Imitation strawberry extract, misbranded; sale illegal
9378 . . . do		Imitation strawberry extract.
9182 . . . do		Imitation strawberry extract, misbranded; sale illegal
9104 . . . do		do.

hard fought by both sides and consumed more than five weeks. The court found:

"1. Flour bleached by the Alsop process contains added poisonous and deleterious ingredients, which render the flour injurious to health.

"2. Flour bleached by the Alsop process contains a substance known as nitrites, which reduces, lowers and injuriously affects the quality and strength of the flour.

"3. Flour bleached by the Alsop process is mixed, colored and stained in a manner whereby damage or inferiority is concealed.

"4. For these reasons flour bleached by the Alsop process is adulterated within the meaning of the Food Law, and that the character of the adulteration is such that no statement upon the package or label will bring bleached flour within the law.

"Practically the above decision has been reached by several courts, both State and Federal, and it is not likely that these decisions will be reversed by the higher courts. However, when they are confirmed by the higher courts, officials will then feel absolutely sure of their position, and violations will be more vigorously prosecuted."

During the past year 310 samples of flour have been examined, 48 of which were found to be more or less bleached, and 17 of the 48 samples were bleached to the extent of rendering their sale illegal in the State, while some of them were very slightly bleached. Where the flour was heavily bleached its sale as human food was prevented.

If the higher courts confirm the above decisions, the sale of flour bleached at all will be prohibited in this State.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8788	Flour, White Rose.....	Acme Milling Co., Indianapolis, Ind.	S. J. Stallings, Littleton.....
8789	Flour, Columbia.....	do.....	do.....
8815	Flour, Floribel.....	Acme-Evans Co., Indianapolis, Ind.	Herring & Hobbs, Warsaw.....
8820	Flour, E. Z. Bake.....	do.....	B. F. Powell, Clinton.....
8817	Flour, Eldean.....	Allen-Wheeler Co., Troy, Ohio.....	A. W. Aman, Clinton.....
8816	Flour, Trojan.....	do.....	do.....
8977	Flour, Eldean.....	do.....	Owenby-Wofford Co., Murphy...
9436	do.....	do.....	C. G. Morris & Co., Washington...
8969	do.....	do.....	Wetmur & Houston, Henderson- ville.
8814	Flour, Lotus.....	Amendt Milling Co., Monroe, Mich.	Herring & Hobbs, Warsaw.....
9454	Flour, Best.....	do.....	J. T. Ginn & Co., Goldsboro.....
9431	Flour.....	do.....	Pearsall & Co., Wilmington.....
8681	Flour, William Tell.....	Ansted-Burke & Co., Springfield, Ohio	D. L. Gore & Co., Wilmington...
8536	Flour, Climax.....	Atlanta Milling Co., Atlanta, Ga...	J. D. Horn, Wadesboro.....
8537	Flour, Saxon.....	do.....	Leak & Marshall, Wadesboro.....
8468	Flour, Miss Dixie.....	do.....	Peebles Bros., Raleigh.....
8469	Flour, Capitol.....	do.....	do.....
8470	do.....	do.....	do.....
8970	Flour, Climax.....	Asheville Milling Co., Asheville, N. C.	H. J. Olive, Asheville.....
9472	Flour, White Lilly.....	Austin-Heaton Co., Durham, N. C.	S. V. Tomlinson, North Wilkes- boro.
8896	Flour, White Rose.....	Baker's, W. B., Sons, Winchester, Va.	Morrow Bros. & Heath, Albe- marle.
8772	Flour, Safety.....	Ballard & Ballard, Louisville, Ky.	American Commission Co., Greensboro.
8774	Flour, Obelisk.....	do.....	do.....
8459	Flour, Brilliant.....	Berryville Milling Co., Berryville, Va.	F. B. Phillips, Raleigh.....
8458	do.....	do.....	do.....
8672	do.....	do.....	W. C. Moye & Sons, Goldsboro
8968	Flour, Primrose.....	do.....	Asheville Grocery Co., Asheville
8925	Flour, Virginia Daisy.....	do.....	Newton Grocery Co., Newton...
8456	Flour, Earth's Best Patent	Beverly Roller Mills, Broad Run, Va.	Len H. Adams, Raleigh.....
8454	Flour.....	do.....	do.....
9025	Flour, Self Rising, Cotton Tail.....	Bernet-Craft & Kauffman Milling Co., St. Louis, Mo.	Dixon & Etheridge, Goldsboro
8928	Flour, Golden Eagle.....	Blanton Roller Mills, Shelby, N. C.	Major Hopper, Shelby.....
8397	Flour, Copyright.....	Blish Milling Co., Seymour, Ind.	Asheville Grocery Co., Asheville
8967	do.....	do.....	do.....
9403	Flour, Porcelain.....	Bowling, Andrew, Staunton, Va.	M. L. Milliken, Hamlet.....
9400	Flour, Snowflake.....	do.....	J. W. Pegram, Hamlet.....
8866	Flour, Porcelain.....	do.....	M. L. Milliken, Hamlet.....

FLOUR NOT FOUND ADULTERATED.

Laboratory Number	Adulterants	Remarks and Conclusions
8788	None found.....	Flour, not bleached.
8789	do.....	do.
8815	do.....	do.
8820	do.....	do.
8817	do.....	do.
8816	do.....	do.
8977	do.....	do.
9436	do.....	do.
8969	do.....	do.
8814	do.....	do.
9454	do.....	do.
9431	do.....	do.
8681	do.....	do.
8536	do.....	do.
8537	do.....	do.
8468	do.....	do.
8469	do.....	do.
8470	do.....	do.
8970	do.....	do.
9472	do.....	do.
8896	do.....	do.
8772	do.....	do.
8774	do.....	do.
8459	do.....	do.
8458	do.....	do.
a 8672	} do.....	do.
8968	do.....	do.
8925	do.....	do.
8456	do.....	do.
8454	do.....	do.
9025	do.....	do.
8928	do.....	do.
8397	do.....	do.
8967	do.....	do.
9403	do.....	do.
9400	do.....	do.
8866	do.....	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8874	Flour, Mt. Albion.....	Bowling, Andrew, Staunton, Va.....	J. H. Monger, Sanford.....
8875	Flour, Perfection.....	do.....	do.....
9394	Flour, O. K.....	Brill, D. S., Marlboro, Va.....	Leak & Marshall, Wadesboro.....
8963	Flour, Catawba.....	Brown, W. E., Marion, N. C.....	Blanton Grocery Co., Marion....
8771	Flour, Maple Leaf.....	Buena Vista Mills, Buena Vista, Va.	Cromess Bros., Winston-Salem..
9439	Flour, Lilly.....	Burroughs, J. P., & Son, Flint, Mich.	E. R. Mixon & Co., Washington..
9441	do.....	do.....	F. G. Paul & Bro., Washington..
8812	Flour, Square Deal.....	Calypso Flour Mill Co., Calypso, N. C.	J. W. Johnson, Warsaw.....
8672	Flour, Sunshine.....	Charleston Milling Co., Charleston, W. Va.	Parkham Supply Co., Henderson
8919	Flour, Uncle Sam.....	Clifton Forge Flour Mills, Clifton Forge, Va.	Harris & McNeally, Mooresville.
8389	Flour.....	Concord Milling Co., Concord, N. C.	Concord Milling Co., Concord ..
8677	Flour, Juno.....	Coombs, W. A., Milling Co., Cold- water, Mich.	The Stone Co., Wilmington.....
8524	Flour, Rob Roy.....	do.....	J. H. Culbreth & Co., Fayette- ville.
8197	do.....	do.....	Caldwell & Carlyle, Lumberton.
9420	Flour, Quaker Hill.....		(For) W. B. Cooper, Wilmington.
8916	Flour, Queen of the Valley	Cosby, I. L., Grottoes, Va.....	Harris & McNeally, Mooresville.
8918	Flour, Jersey Lilly.....	do.....	do.....
9257	Flour, Ovenlifter.....	Cumberland Mills, Nashville, Tenn.	Burns Bros., Wadesboro.....
9395	Flour, Dan Valley.....	Dan Valley Mills, Danville, Va.....	T. L. McRae, Rockingham.....
9401	Flour, White Satin.....	do.....	J. W. Pegram, Hamlet.....
9473	Flour, Oak Ridge.....	do.....	Vaughn-Hemphill Co., North Wilkesboro.
9456	Flour, Dan Valley.....	do.....	Wells Grocery Co., Wilson.....
8678	Flour.....	Dunlop Mills, Richmond, Va.....	The Stone Co., Wilmington.....
9474	Flour, Dunlop Superlative.....	do.....	F. D. Forester, Wilkeboro.....
9475	Flour, Olive Branch.....	do.....	do.....
9476	Flour, James River.....	do.....	do.....
8673	Flour, Violet.....	Dunlop Milling Co., Clarksville, Tenn.	J. W. Brooks, Wilmington.....
8200	Flour, Forest King.....	Dunlop Mills, Richmond, Va.....	John P. McNeill, Lumberton....
8888	Flour, Gallego.....	do.....	Peeler Grain and Provision Co., Salisbury.
8782	Flour, Dunlop Superlative.....	do.....	P. A. Revis Co., Louisburg.....
8785	Flour, Forest King.....	do.....	do.....
9034	Flour, Anchor.....	do.....	The Atkinson Co., Elkin.....
8980	Flour, Gold Coin.....	Eagle Roller Mills, New Ulm, Minn.	Baird Bros., Asheville.....
8964	Flour, Pure Silver.....	do.....	Blanton Grocery Co., Marion....
8544	Flour, Ideal.....	Eagle Flouring Mills Co., Sweet Water, Tenn.	Cochrane & McLaughlin, Char- lotte.
8543	Flour, Our Own.....	do.....	do.....
9424	Flour, Gold Coin.....	Eagle Roller Mill Co., New Ulm, Minn.	Corbett & Co., Wilmington.....

NOT FOUND ADULTERATED—*Continued.*

Laboratory Number	Adulterants	Remarks and Conclusions
8874	None found.....	Flour, not bleached
8875	...do.....	do.
9394	...do.....	do.
8963	...do.....	do.
8771	...do.....	do.
9439	...do.....	do.
9441	...do.....	do.
8812	...do.....	do.
8672	...do.....	do.
8919	...do.....	do.
8389	...do.....	do.
8677	...do.....	do.
8524	...do.....	do.
8197	...do.....	do.
9120	...do.....	do.
8916	...do.....	do.
8918	...do.....	do.
9257	...do.....	do.
9395	...do.....	do.
9401	...do.....	do.
9473	...do.....	do.
9456	...do.....	do.
8678	...do.....	do.
9474	...do.....	do.
9475	...do.....	do.
9476	...do.....	do.
8673	...do.....	do.
8200	...do.....	do.
8888	...do.....	do.
8732	...do.....	do.
8785	...do.....	do.
9034	...do.....	do.
8980	...do.....	do.
8964	...do.....	do.
8544	...do.....	do.
8543	...do.....	do.
9424	...do.....	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8929	Flour, Blue Ribbon.....	Edinburg Milling Co., Edinburg, Va.	Major Hopper, Shelby.....
8696	Flour, Puritan.....	Eldred Mill Co., Jackson, Mich.	Hall & Pearsall, Wilmington....
8676	Flour, Eldred.....	do.....	J. W. Brooks, Wilmington.....
8523	Flour, Charm.....	do.....	J. H. Culbreth & Co., Fayette- ville.
8522	Flour, Rose Bud.....	do.....	do.....
8527	Flour, Puritan.....	do.....	A. E. Rankin & Co., Fayetteville.
9443	Flour, Rose Bud.....	do.....	P. L. Woodard & Co., Wilson....
9447	Flour, Eldred Patent.....	do.....	Tomlinson & Co., Wilson.....
8526	Flour, Pearl.....	do.....	Adams Grain and Provision Co., Charlotte.
8757	Flour, Moss Rose*.....	Empire Roller Mills, Millersburg, Ohio.	Boykin Grocery Co., Wilson.....
9446	Flour, Daisey Patent.....	do.....	Tomlinson & Co., Wilson.....
9445	Flour, Moss Rose.....	do.....	Hadley-Harris Co., Wilson.....
8822	Flour, Floribel.....	Evans, Geo. T., & Son, Indianap- olis, Ind.	B. F. Powell, Clinton.....
8927	Flour, Faultless.....	Farmers Milling Co., Bridgewater, Va.	Newton Grocery Co., Newton...
9045	Flour, Banner.....	Fulmer-Ford Milling Co., Mt. Ver- non, Ind.	Madison Grocery Co., Madison...
9047	Flour, Emperor.....	do.....	C. D. Bussick, Madison.....
8792	Flour, World's Champion..	Furr Bros., East Lexington, Va....	Gem Grocery Co., Littleton.....
8500	Flour, Champion.....	do.....	F. V. Johnson, Greenville.....
8535	Flour, World's Champion..	do.....	H. W. Little & Co., Wadesboro...
9438	Flour, Garland.....	Garland Milling Co., Greensburg, Ind.	E. R. Mixon & Co., Washington..
8547	Flour, Royal Seal.....	Geary Elevator and Mill Co., Geary Okla.	Herbert Irwin, Charlotte.....
8926	Flour, Gish's Best.....	H. L. Gish, Mercersburg, Pa.....	Newton Grocery Co., Newton...
8406	Flour, Eagle.....	Glasgow Milling Co., Glasgow, Mo.	Fain-Mayfield Co., Murphy.....
8973	Flour.....	do.....	Fain Grocery Co., Murphy.....
8974	Flour, Gem.....	do.....	do.....
8975	Flour, Eagle.....	do.....	do.....
8882	Flour, Our Best.....	Grimes Bros., Lexington, N. C....	W. H. Moffitt & Co., Lexington..
8894	Flour, Silver Leaf.....	do.....	M. F. Little, Albemarle.....
8540	Flour, Seal of Ohio.....	Gwinn Milling Co., Columbus, Ohio.	Adams Grain and Provision Co., Charlotte.
9477	Flour, Square Deal.....	do.....	S. V. Tomlinson, Wilkesboro.....
8478	Flour, Jefferson.....	do.....	do.....
8768	Flour, King Philip.....	do.....	Norman-Moir-Dalton Co., Wins- ton-Salem.
8769	Flour, Jefferson.....	do.....	do.....
8770	Flour, Square Deal.....	do.....	do.....
9019	Flour, Jack Frost.....	Hale, Jonathan, & Sons, Ionia, Mich.	The Love Co., Gastonia.....
8767	Flour, Acme.....	Harmon & De Runeau, Crimora, Va.	J. J. Adams, Sons Co. Winston- Salem.
8685	Flour, Tidal Wave.....	(For) Hashagen, F. E., Wilmington, N. C.	F. E. Hashagen, Wilmington....
8684	Flour, Dinner Bell.....	do.....	do.....

* Sent to Department for analysis

NOT FOUND ADULTERATED—*Continued.*

Laboratory Number	Adulterants	Remarks and Conclusions
8929	None Found	Flour, not bleached.
8696	do	do.
8676	do	do.
8523	do	do.
8522	do	do.
8527	do	do.
9443	do	do.
9447	do	do.
8526	do	do.
8757	do	do.
9446	do	do.
9445	do	do.
8822	do	do.
8927	do	do.
9045	do	do.
9047	do	do.
8792	do	do.
8500	do	do.
8535	do	do.
9438	do	do.
8547	do	do.
8926	do	do.
8406	do	do.
8973	do	do.
8974	do	do.
8975	do	do.
8882	do	do.
8894	do	do.
8540	do	do.
9477	do	do.
9478	do	do.
8768	do	do.
8769	do	do.
8770	do	do.
9019	do	do.
8767	do	do.
8635	do	do.
8634	do	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8959	Flour, White Satin	Hickory Milling Co., Hickory, N.C.	T. E. Field, Hickory
9466	Flour	Hico Milling Co., Burlington, N. C.	M. V. Lawrence, Durham
9467	do	do	do
8958	Flour, Imperial	do	do
8813	Flour, Point Lace	Holmes Grocery Co., Wilmington, N. C.	J. W. Johnson, Warsaw
8393	Flour, Good Luck	Holt Granite Mfg. Co., Haw River, N. C.	G. T. McLamb, High Point, N. C.
8465	Flour, Imperial	Jefferson Milling Co., Charlestown, W. Va.	Dewar & Wilder, Raleigh
8541	do	do	Adams Grain and Provision Co., Charlotte
8784	Flour, Excelsior	Jenkins, W. S., Co., Leesburg, Va.	P. A. Revis Co., Louisburg
9440	Flour, Pure Gold	King Milling Co., Lowell, Mich.	Carolina Distributing Co., Wash- ington
8466	Flour, Gilt Edge	Knightly Milling Co., Knightly, Va.	Dewar & Wilder, Raleigh
8410	Flour, Majestic	Knoxville City Mills, Knoxville, Tenn	City Feed Co., Hickory
8818	Flour, Pride of Richmond	Koerner, J. Lee, Richmond, Va.	A. W. Aman, Clinton
9412	Flour, Blue Ribbon	Lam & Whitmore, Grottoes, Va.	L. H. Caldwell, Lumberton
8956	Flour, Town Talk	Lawrenceburg Roller Mills, Law- renceburg, Ind.	Wanpum Department Store, Lin- colnton
8396	Flour, Paul Jones	do	Asheville Grocery Co., Asheville
9026	Flour, Self Rising*	Lenoir Mills, Lenoir, N. C.	Lenoir Mills, Lenoir
9036	Flour, Dixie	Lexington Roller Mills, Lexington, Ky.	Hendersonville Grocery Co., Hen- dersontonville
9256	Flour, Leonte	Liberty Mills, Nashville, Tenn.	W. D. Wright, Laurinburg
8199	do	do	J. P. McNeill, Lumberton
8457	Flour, Virginia's Pride	Lonas, S. P., Mt. Jackson, Va.	L. H. Adams, Raleigh
8455	do	do	do
8864	Flour, Faultless	Lynchburg Milling Co., Lynchburg, Va.	C. V. Williams & Co., Hamlet
9442	do	do	Wells Grocery Co., Wilson
8793	do	do	Royal Feed and Grocery Co., Lit- tleton
8791	Flour, White Cap	do	Eastern Grocery Co., Littleton
8790	Flour, Faultless	do	do
9434	Flour, Wasco	Lyon & Greenleaf, Wauseon, Ohio	Pugh & Brooks, New Bern
8674	do	do	J. W. Brooks, Wilmington
8868	Flour, Supreme	Manor, J. D., & Co., New Market, Va.	J. W. Pegram, Hamlet
9011	do	do	McNair & Pearsall, Wilmington*
8542	Flour, Ann Arbor	Michigan Milling Co., Ann Arbor, Mich.	Cochrane & McLaughlin, Char- lotte
8683	Flour, Kings	do	A. W. King & Co., Wilmington
8521	Flour, Ann Arbor	do	J. H. Culbreth, Fayetteville
9444	Flour, Victoria	J. T. Miller & Sons, Millersburg, Ohio	P. L. Woodard & Co., Wilson
8496	Flour, Moss Rose	do	Hadley-Harris Co., Wilson
8499	Flour, Victoria	do	F. G. Paul & Bro., Washington

* Sent to the Department for analysis.

NOT FOUND ADULTERATED—*Continued.*

Laboratory Number	Adulterants	Remarks and Conclusions
8959	None found	Flour, not bleached.
9466	do.	do.
9467	do.	do.
8958	do.	do.
8813	do.	do.
8393	do.	do.
8465	do.	do.
8541	do.	do.
8784	do.	do.
9440	do.	do.
8466	do.	do.
8410	do.	do.
8818	do.	do.
9412	do.	do.
8955	do.	do.
8396	do.	do.
9026	do.	do.
9036	do.	do.
9256	do.	do.
8199	do.	do.
8457	do.	do.
8455	do.	do.
8864	do.	do.
9442	do.	do.
8793	do.	do.
8791	do.	do.
8790	do.	do.
9434	do.	do.
8674	do.	do.
8868	do.	do.
9011	do.	do.
8542	do.	do.
8683	do.	do.
8521	do.	do.
9444	do.	do.
8496	do.	do.
8499	do.	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9397	Flour, Cream of the Valley.	Mitchell & Shank, Timberville, Va.	Rice & Folsom, Hamlet.....
9402	do.....	do.....	E. N. Rhodes, Hamlet.....
8865	do.....	do.....	M. L. Milliken, Hamlet.....
8881	Flour, Monarch.....	Model Mills, Lexington, N. C.....	W. H. Moflitt, Lexington.....
8483	Flour, Claremont Beauty..	Monitor Mill Co., Claremont, N. C.	S. V. Tomlinson, North Wilkes- boro.
9429	Flour, Best.....	R. P. Moore Milling Co., Princeton, Ind.	Hall & Pearsall, Wilmington.....
8694	Flour, Moore's Best.....	do.....	do.....
9415	Flour, Ohio Beauty.....	Morrow Roller Mill Co., Morrow, Ohio.	F. C. Branch, Lumberton.....
8196	do.....	do.....	W. J. Prevatt, Lumberton.....
9258	Flour, Little Pilgrim.....	Nashville Roller Mills, Nashville, Tenn.	Culp Bros., Charlotte.....
9421	Flour, Gloria.....	do.....	W. B. Cooper, Wilmington.....
9432	Flour, North Star.....	Northwestern Elevator and Mill Co., Toledo, Ohio.	Pearsall & Co., Wilmington.....
8698	do.....	do.....	do.....
8531	Flour, Queen City.....	Ohio-Indiana Milling Association, Cincinnati, Ohio	Currie & Patterson, Maxton.....
8971	Flour, Olive.....	(For) H. J. Olive, Asheville, N. C.	H. J. Olive, Asheville.....
8539	Flour, Acme.....	Parks, Alexander, Martinsburg, W. Va.	J. F. Jamison & Co., Charlotte..
9455	Flour, Piedmont.....	Piedmont Mills, Lynchburg, Va.....	J. T. Ginn & Co., Goldsboro.....
9448	do.....	do.....	Tomlinson & Co., Wilson.....
8464	Flour, Mountain Rose.....	do.....	Norris Bros., Raleigh.....
8689	do.....	do.....	The Worth Co., Wilmington.....
8891	Flour, Diamond.....	do.....	Overman & Co., Salisbury.....
8773	Flour, Table Talk.....	Pioneer Mills, Louisville, Ky.....	American Commission Co., Greensboro.
9411	Flour, Our Best.....	Port Republic Milling Co., Port Republic, Va.	L. H. Caldwell, Lumberton.....
8467	Flour, Royal Patent.....	do.....	Dewar & Wilder, Raleigh.....
8872	Flour, Purity.....	do.....	Sanford Grocery Co., Sanford...
8195	Flour, Our Best.....	do.....	L. H. Caldwell, Lumberton.....
8193	Flour, White Swan.....	do.....	do.....
8395	Flour, Purina Health.....	Purina Mills, St. Louis, Mo.....	Asheville Provision Co., Asheville
9418	Flour, Blue Ribbon.....	Richards-Evans Co., Cortland, Ohio.	Currie & Patterson, Maxton.....
8484	Flour.....	Riverton Mills, Riverton, Va.....	S. V. Tomlinson, North Wilkes- boro.
8960	Flour, Carnation.....	Rhyne, Yount & Co., Newton, N.C.	T. E. Field, Hickory.....
9450	Flour, Upper crust.....	Saginaw Milling Co., Saginaw, Mich.	M. J. Best & Sons, Goldsboro....
8700	Flour, Uncle Sam.....	do.....	Pearsall & Co., Wilmington.....
8885	Flour, Purity.....	Salisbury Milling Co., Salisbury, N. C.	M. S. Varner, Salisbury.....
8886	Flour, Bakers' Straight.....	do.....	do.....
8871	Flour, Sanford's Best.....	(For) Sanford Grocery Co., San- ford, N. C.	Sanford Grocery Co., Sanford...
9033	Flour, White Rose.....	Shore-Styer & Myers, Yadkinville, N. C.	The Atkinson Co., Elkin.....

NOT FOUND ADULTERATED—*Continued.*

Laboratory Number	Adulterants	Remarks and Conclusions
9397	None found.....	Flour, not bleached
9402	...do.....	do.
8865	...do.....	do.
8881	...do.....	do.
8483	...do.....	do.
9429	...do.....	do.
8694	...do.....	do.
9415	...do.....	do.
8196	...do.....	do.
9258	...do.....	do.
9421	...do.....	do.
9432	...do.....	do.
8698	...do.....	do.
8531	...do.....	do.
8971	...do.....	do.
8539	...do.....	do.
9455	...do.....	do.
9448	...do.....	do.
8464	...do.....	do.
8689	...do.....	do.
8891	...do.....	do.
8773	...do.....	do.
9411	...do.....	do.
8467	...do.....	do.
8872	...do.....	do.
8195	...do.....	do.
8193	...do.....	do.
8395	...do.....	do.
9418	...do.....	do.
8484	...do.....	do.
8960	...do.....	do.
9450	...do.....	do.
8700	...do.....	do.
8885	...do.....	do.
8886	...do.....	do.
8871	...do.....	do.
9033	...do.....	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9396	Flour, Magnolia.....	D. A. Slickell & Son, Hagerstown, Md.	A. W. Porter, Rockingham.....
8965	Flour, Snow.....	Smith, J. Allen, Knoxville, Tenn.	Blanton Grocery Co., Marion.....
8966	Flour, Clover Leaf	do.....	do.....
8978	Flour, Jasco.....	do.....	Baird, Bros. Asheville.....
9419	Flour, Diadem.....	do.....	W. B. Cooper, Wilmington.....
8979	Flour, Evidence.....	do.....	Baird Bros., Asheville.....
8981	Flour, Snow.....	do.....	Asheville Provision Co., Ashe- ville.....
8890	Flour, Majestic.....	do.....	Overman & Co., Salisbury.....
8409	Flour, Jasco.....	do.....	City Feed Co., Hickory.....
8930	Flour, Pan Dandy	Southern Indiana Mill Co., Jeffer- son, Ind.	W. J. Arey, Shelby.....
8682	Flour.....	Sparks Milling Co., Terre Haute, Ind.	D. L. Gore & Co., Wilmington
8394	Flour, Richelieu.....	Sprague-Warner & Co., Chicago, Ill.	Asheville Provision Co., Ashe- ville.....
8549	Flour, Economy.....	Sprinkle, J. P., & Son, Lewisville, N. C.	Farmers Stock Co., Winston- Salem.....
8823	Flour, Faultless.....	Standard Cereal Co., Chillicothe, Ohio.	W. D. Kelly, Clinton.....
8819	Flour, Little Duke.....	do.....	J. H. Register & Co., Clinton.....
8525	Flour, Roller Cream.....	Statesville Flour Mill Co., States- ville, N. C.	Adams Grain and Provision Co., Charlotte.....
9414	Flour, White Rose.....	do.....	Caldwell & Carlyle, Lumberton..
9413	Flour, Cupid.....	do.....	do.....
8411	Flour, Triumph.....	do.....	Morrison Provision Co., Hickory..
8412	Flour, Cyclone.....	do.....	do.....
9433	Flour, Gold Dust.....	do.....	Pearsall & Co., Wilmington.....
8546	Flour, Crystal.....	do.....	Herbert Irwin, Charlotte.....
8697	Flour, Cyclone.....	do.....	Pearsall & Co., Wilmington.....
8198	Flour, Snow Cream.....	do.....	Caldwell & Carlyle, Lumberton
8897	Flour, Snow Bird	do.....	Albemarle Grocery Co., Albe- marle.....
8895	Flour, Monitor.....	do.....	M. F. Little, Albemarle.....
8893	Flour, Snow Bird.....	do.....	Stanly Supply Co., Albemarle ..
8889	Flour, Crystal.....	do.....	Peeler Grain and Provision Co., Salisbury.....
8923	do.....	do.....	Armstrong & Co., Gastonia.....
8962	Flour, White Rose.....	do.....	J. A. Shuping, Morganton.....
8961	Flour, Cyclone.....	do.....	do.....
8957	Flour, Triumph.....	do.....	City Feed Co., Hickory.....
8787	Flour, Standard	Stephens City Mill Co., Stephens City, Va.	Littleton Feed and Grocery Co., Littleton.....
8690	Flour.....	Stotts Milling Co., Detroit, Mich.	The Worth Co., Wilmington.....
8687	Flour, Aeme.....	do.....	do.....
9017	Flour, Peerless.....	Strong, John, & Son, South Rock- wood, Mich.	White-Morrison-Flowe Co., Con- cord, N. C.

NOT FOUND ADULTERATED—*Continued.*

Laboratory Number	Adulterants	Remarks and Conclusions
9396	None found	Flour, not bleached.
8965	do	do
8966	do	do.
8978	do	do.
9419	do	do.
8979	do	do.
8981	do	do.
8890	do	do.
8409	do	do.
8930	do	do.
8682	do	do.
8394	do	do.
8549	do	do.
8823	do	do.
8819	do	do.
8525	do	do.
9414	do	do.
9413	do	do.
8411	do	do.
8412	do	do.
9433	do	do.
8546	do	do.
8697	do	do.
8198	do	do.
8897	do	do.
8895	do	do.
8893	do	do.
8889	do	do.
8923	do	do.
8962	do	do.
8961	do	do.
8957	do	do.
8787	do	do.
8690	do	do.
8687	do	do.
9017	do	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9035	Flour, White Swan.....	Stuarts Draft Milling Co., Stuarts Draft, Va.	S. V. Tomlinson, North Wilkes- boro.
9251	Flour, Self Rising*.....		S. B. Tanner, Saluda.....
8887	Flour, Wheat Hearts.....	Tatum, P. O., Salisbury, N. C.....	M. S. Varner, Salisbury.....
8976	Flour, Nellie King.....	Tennessee Mill Co., Estill Springs, Tenn.	Fain Grocery Co., Murphy.....
9482	do.....	do.....	S. V. Tomlinson, Wilkesboro.....
9417	Flour, Moss Rose.....	Thoman Milling Co., Lansing, Mich.	J. W. Carter, Maxton.....
8869	Flour, Oriole.....	do.....	E. N. Rhodes, Hamlet.....
8560	Flour, Sea Foam.....	do.....	Broad Street Grocery Co., New Bern.
8708	Flour, Calla Lilly.....	do.....	M. J. Best & Sons, Goldsboro....
8530	Flour, White Moss Rose.....	do.....	J. W. Carter, Maxton.....
8775	Flour, Champion.....	Triplett, J. I., Woodstock, Va.....	American Commission Co., Greensboro.
9416	Flour, Dainty.....	Valeirs & Spies Co., Marine, Ill.....	J. W. Carter, Maxton.....
9425	Flour, Marine Star.....	do.....	Corbett & Co., Wilmington.....
8821	Flour, Dainty.....	do.....	B. F. Powell, Clinton.....
9423	Flour.....	do.....	Corbett & Co., Wilmington.....
9422	Flour, Dainty.....	do.....	do.....
8529	do.....	do.....	J. W. Carter, Maxton.....
8497	Flour, Roller Champion....	Valley City Mill Co., Grand Rapids, Mich.	Hadley-Harris Co., Wilson.....
8695	Flour, Princess Anne.....	Virginia-Maryland Milling Asso- ciation, Norfolk, Va.	Brown-Toon Co., Wilmington...
9048	do.....	do.....	Chas. Peele, Faith.....
8679	Flour.....	Voigt Milling Co., Grand Rapids, Mich.	B. F. Mitchell & Co., Wilmington.
8688	Flour, Queen.....	do.....	The Worth Co., Wilmington.....
8680	Flour, Snow Drift.....	do.....	B. F. Mitchell & Co., Wilmington.
8692	Flour, Above All.....	do.....	do.....
9430	do.....	do.....	Hall & Pearsall, Wilmington.....
9427	Flour, Voigt's.....	do.....	do.....
9410	Flour, Royal.....	do.....	L. H. Caldwell, Lumberton.....
9449	Flour, Gold Medal.....	Washburn-Crosby Milling Co., Louisville, Ky.	M. J. Best & Sons, Goldsboro....
9426	do.....	do.....	Hall & Pearsall, Wilmington.....
8675	do.....	do.....	J. W. Brooks, Wilmington.....
8870	do.....	do.....	E. N. Rhodes, Hamlet.....
9452	Flour, Perfection.....	Watson & Frost, Grand Rapids, Mich.	B. G. Thompson & Son, Golds- boro.
9451	Flour, Golden Sheaf.....	Watson-Higgins Milling Co., Grand Rapids, Mich.	do.....
8898	Flour, New Perfection*.....	do.....	E. G. Hines, Goldsboro.....
8863	Flour, Melrose.....	White Star Mills, Staunton, Va.....	C. V. Williams & Co., Hamlet...
8892	do.....	do.....	Stanly Supply Co., Albemarle...
9435	Flour, Perfection.....	Williams Bros., Kent, Ohio.....	Robert & Hurst, New Bern.....

* Sent to Department for analysis.

NOT FOUND ADULTERATED—*Continued.*

Laboratory Number	Adulterants	Remarks and Conclusions
9035	None found	Flour, not bleached.
9251	do.	do.
8887	do.	do.
8976	do.	do.
9482	do.	do.
9417	do.	do.
8869	do.	do.
8560	do.	do.
8708	do.	do.
8530	do.	do.
8775	do.	do.
9416	do.	do.
9425	do.	do.
8821	do.	do.
9423	do.	do.
9422	do.	do.
8529	do.	do.
8497	do.	do.
8693	do.	do.
9048	do.	do.
8679	do.	do.
8688	do.	do.
8680	do.	do.
8692	do.	do.
9430	do.	do.
9227	do.	do.
9410	do.	do.
9449	do.	do.
9426	do.	do.
8675	do.	do.
8870	do.	do.
9452	do.	do.
9451	do.	do.
8898	do.	do.
8863	do.	do.
8892	do.	do.
9435	do.	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9428	Flour, perfection	Williams Bros., Kent, Ohio	Hall & Pearsall, Wilmington
891	Flour, King Kotton	do.	The Worth Co., Wilmington
8695	Flour, Perfection	do.	Hall & Pearsall, Wilmington

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8492	Flour*		Asheville Milling Co., Asheville
8873	Flour, Banner	Austin-Heaton Co., Durham, N. C.	J. H. Monger, Sanford
8780	do	do.	McKinne Bros. & Co., Louisburg
8781	Flour, Peerless	do.	do.
8805	do	do.	Carpenter Bros., Durham
8806	do	do.	do.
8717	Flour, Lexington Cream	Cockley Milling Co., Lexington, Ohio.	Cash Grocery Co., Scotland Neck
8716	Flour, Robin Hood	do.	do.
8786	Flour, Lexington Cream	do.	Littleton Feed and Grocery, Co. Littleton.
8783	do	do.	P. A. Revis & Co., Louisburg
8532	do	do.	Currie & Patterson, Maxton
8390	Flour*	Concord Milling Co., Concord, N. C.	Concord Milling Co., Concord
8391	do*	do.	do.
9044	Flour, White Rose	do.	Cline & Moore, Concord
8922	do	do.	F. D. Barkley & Co., Gastonia
8972	Flour, Cream	Cumberland Mills, Nashville, Tenn.	H. J. Olive, Asheville
9028	do	do.	do.
9437	Flour, Buckeye Cream	Dewey Bros. Co., Blanchester, Ohio.	Pippin & Wallard, Washington
8880	Flour, Tar Heel's Delight	Grimes Bros., Lexington, N. C.	W. H. Moffitt, Lexington
8883	Flour, Silver Cloud	Grimes Milling Co., Salisbury, N. C.	H. Z. White, Salisbury
8884	Flour, Grimes' First	do.	do.
533	Flour, City Belle	Harrisonburg Milling Co., Harrisonburg, Va.	Baldwin Grocery Co., Rockingham
471	Flour, Banquet	do.	W. A. Myatt, Raleigh
538	Flour, Luxury	High Point Milling Co., High Point, N. C.	J. F. Jamison & Co., Charlotte
8920	do	do.	W. M. Neal & Co., Mooresville
8392	Flour, Morning Star	Holt Granite Mfg. Co., Haw River, N. C.	J. T. McLamb, High Point

* Sent to Department for analysis

NOT FOUND ADULTERATED—*Continued.*

Laboratory Number	Adulterants	Remarks and Conclusions
9428	None found.....	Flour, not bleached
8691	do.....	do.
8695	do.....	do.

BLEACHED WITH NITROGEN PEROXIDE.

Laboratory Number	Milligrams Nitrous Nitrogen Per Kilo of Flour	Remarks and Conclusions
8492	Slight trace.....	Flour. The sample was too small to obtain satisfactory results.
8873	0.50	Flour, so bleached that it contains more nitrous nitrogen than is allowed; sale illegal.
8780	0.30	Flour, slightly bleached.
8781	Slight trace.....	do.
8805	0.15	do.
8806	0.12	do.
8717	Large amount.....	Flour, bleached; sale illegal.
8716	Trace.....	Flour, slightly bleached.
8786	0.30	do.
8783	0.20	do.
8532	0.45	Flour, bleached; sale illegal
8390	Slight trace.....	Flour, slightly bleached.
8391	Trace.....	do.
9044	do.....	do.
8922	0.25	do.
8972	1.48	Flour, bleached; sale illegal.
9028	1.48	do.
9437	0.20	Flour, slightly bleached.
8880	0.20	do.
8883	0.37	Flour, bleached; sale illegal
8884	0.45	do.
8533	0.35	do.
8471	0.30	Flour, slightly bleached.
8538	0.37	Flour, bleached; sale illegal.
8920	0.25	Flour, slightly bleached.
8392	Slight trace.....	do.

RESULTS OF THE EXAMINATION OF FLOUR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9453	Flour, Morning Star	Holt-Granite Manufacturing Co., Haw River, N. C.	J. T. Ginn & Co., Goldsboro.....
8462	Flour, Pick of the Harvest.....	do.....	Crowder & Rand, Raleigh.....
8460	Flour, Old Glory.....	do.....	do.....
8917	Flour, Ice Cream.....	Horne & Johnson Co., Mockville, N. C.	Harris & McNeally, Mooresville.....
8921	Flour, Ladies' Favorite	Lillie Mill Co., Franklin, Tenn.....	F. D. Barkley Co., Gastonia.....
8924	Flour, Supreme.....	Manor, J. D., & Co., New Market, Va.	D. A. Page & Co., Gastonia.....
9404	Flour, Sublime.....	do.....	M. L. Milliken, Hamlet.....
8474	do.....	do.....	Norris Bros. Co., Raleigh.....
8867	do.....	do.....	M. L. Milliken, Hamlet.....
8686	Flour.....	(For) McNair & Pearsall, Wilmington, N. C.	.....
8545	do.....	A. F. Messiek Grocery Co., Charlotte, N. C.	A. F. Messiek Grocery Co., Charlotte.
9408	do*.....	Newton Roller Mills, Newton, N. C.	Newton Roller Mills, Newton.....
8461	Flour, Mt. Vernon.....	Northwestern Mill and Elevator Co., Toledo, Ohio.	Crowder & Rand, Raleigh.....
8699	Flour, Blue Ribbon.....	Richards-Evans Co., Cortland, Ohio.	Pearsall & Co., Wilmington.....
a 8524	} do.....	do.....	Covington-Hammond Co., Laurinburg.
8498	do.....	do.....	F. G. Paul & Bro., Washington.....
9049	Flour, Golden Sheaf.....	Slickell, D. A., & Son, Hagerstown, Md.	White-Morrison-Flowe Co., Concord.
8824	Flour*.....	Statesville Flour Mills, Statesville, N. C.	Statesville Flour Mills, Statesville.
9259	Flour, Star.....	Watson, W. A., Greensboro, N. C.	J. H. Low, Greensboro.....
8707	Flour, Snow Ball.....	Thoman Milling Co., Lansing, Mich.	M. J. Best & Sons, Goldsboro.....
8706	Flour, Gold Medal.....	do.....	B. G. Thompson & Son, Goldsboro.
8705	Flour, White Moss Rose.....	do.....	do.....

* Sent to Department for analysis.

HONEY.

Honey is the nectar and saccharine exudations of plants gathered, modified, and stored in the comb by honey bees; is laevorotary, contains not more than 25 per cent of water, not more than 0.25 per cent of ash, and not more than 8 per cent of cane sugar.

The principal adulteration of honey consists of the addition of either or both cane sugar sirup or glucose sirup, either of which is fairly easy to detect. It is also not an uncommon practice to feed bees, when flowers are scarce, with sugar in some form to carry them along till they can get a supply of nectar from flowers. But in order to lessen the work of the hive and to increase production, cane sugar is sometimes

BLEACHED WITH NITROGEN PEROXIDE—*Continued.*

Laboratory Number	Milligrams Nitrous Nitrogen Per Kilo of Flour	Remarks and Conclusions
9453	0.40	Flour, bleached; sale illegal.
8462	Trace.....	Flour.
8460	.....do.....	do.
8917	0.27	Flour, slightly bleached.
8921	Slight trace.....	Flour.
8924	0.47	Flour, bleached; sale illegal.
9404	Trace.....	Flour, trace of bleaching agent.
8474	0.55	Flour, bleached; sale illegal.
8867	Slight trace.....	Flour.
8686	0.70	Flour, bleached; sale illegal.
8545	0.37	do.
9408	Trace.....	Flour, containing trace of bleaching agent.
8461	Slight trace.....	Flour.
8699	Trace.....	do.
a 8524	0.25	Flour, slightly bleached.
8498		
9049	0.15	do.
8824	Slight trace.....	Flour.
9259	0.20	Flour, slightly bleached.
8707	Trace.....	Flour, with trace of bleaching agent.
8706	.....	Flour, misbranded; is not full patent or fancy quality. Appears to contain bran or shorts or both. Sale illegal.
8705	.....	Flour, appeared hardly to be as represented on package.
	.....	Flour, appeared to be misbranded. It appeared not to be a patent flour.

fed abundantly and continuously when it is not at all necessary to the bees.

This cane sugar, more or less converted by the bees into invert sugar, is laid down in the comb; but according to the definition given above, is not, strictly speaking, true honey and is regarded as an adulteration. The proprietor does not add the cane sugar to the honey himself, but causes his employees, the bees, to do so.

Sixteen samples of honey were examined, only one of which was adulterated, and it contained about 75 per cent of glucose. It, however, printed in very small type at the bottom of the label, where it would not ordinarily be seen, contained the word "compound." Under the State Food Law it was adulterated and misbranded.

RESULTS OF THE EXAMIN-

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9015	Honey.....	American Preserve Co., Phila- delphia, Pa.	Thomas L. Dodd, Asheville.
9275	do.....	do.....	Burns, Bros., Wadesboro....
8516	do*.....	.....	C. D. Harris, Raleigh.....
9281	Honey, Busy Bee.....	Austin-Nichols Co., New York, N. Y.	J. F. Powers & Son, Fayetteville.
8518	Honey.....	Harmon, C. W., & Co., Asheville, N. C.	W. E. Logan, Greensboro.....
9291	do.....	Leggett, Francis H., New York....	Peoples Supply Co., Wilmington.
9279	Honey, Orange Bloom.....	McCaull, Jos. M., & Son, New York, N. Y.	Great Atlantic and Pacific Tea Co., Greensboro.
9276	Honey, Town Talk.....	Muth, Fred. W. Cincinnati, Ohio...	Hudson & Kirk, Wadesboro.....
9278	Honey.....	New England Maple Syrup Co., Boston, Mass.	C. M. Bridgers & Co., Charlotte.
9274	do.....	St. Louis Syrup and Preserve Co., St. Louis, Mo.	J. W. Hall & Co., Rockingham..
9280	Honey, Compound, My Maryland.	Van Lill, S. J., Co., Baltimore, Md..	Walton Bros., Wilmington.....
9012	Honey.....	Weber, C. H. W., Cincinnati, Ohio..	Thomas L. Dodd, Asheville.....
9014	do.....	do.....	do.....
9273	do.....	do.....	G. W. Goodwyn, Laurinburg.....
9277	do.....	Williams, R. C., New York, N. Y....	Bruner & Huey, Monroe.....

*Sent to Department for analysis.

ICE CREAM AND ICE CREAM SUBSTITUTES.

Ice cream is a frozen product made from cream and sugar, with or without a natural flavoring, and contains not less than 14 per cent of milk fat.

Fruit ice cream is a frozen product made from cream, sugar and sound, clean, mature fruits, and contains not less than 12 per cent of milk fat.

Nut ice cream is a frozen product made from cream, sugar and sound nonrancid nuts, and contains not less than 12 per cent of milk fat.

Many products, such as eggs, gelatine, etc., are used in the manufacture of so-called ice cream, which is often very palatable, but which is not ice cream, and if sold as such is a violation of the law.

RULING OF BOARD ON SALE OF ICE CREAM.

"The sale of a product as ice cream containing gelatine, eggs, gum tragacanth or other vegetable gums, or the sale of a product as ice cream which contains less than the required per cent of milk fat will not be contested, provided the same is labeled and sold as imitation ice cream, compound ice cream, gelatine ice cream, egg ice cream,

NATION OF HONEY.

Laboratory Number	Total Ash— Per Cent	Water— Per Cent	Direct Polarization at 25°C. V.S.	Invert Polarization at 25°C. V.S.	Sucrose (Chergot)— Per Cent.	Glucose— Per Cent.	Remarks and Conclusions
9015	0.13	22.82	-15.0	18.0	2.30		Honey.
9275	0.16	21.09	-15.8	19.2	2.61		do
8516							do
9281	0.04	21.08	-12.5	18.0	4.22		do.
8518							do.
9291	0.06	15.03	-14.0	23.0	6.90		Honey, not properly labeled; does not show name and address of manufacturer.
9279	0.08	19.84	-13.8	22.0	6.29		Honey.
9276	0.16	17.21	-11.6	16.0	3.38		do
9278	0.11	16.83	-15.8	18.0	1.69		do.
9274	0.16	18.79	-13.5	19.0	4.20		do.
9280	0.28	23.33	+135.0	+132.0	2.30	75.83	Glucose, containing a small amount of honey; not properly labeled; misbranded; sale illegal. The word compound was printed in very small type.
012	0.06	16.76	-15.6	18.0	1.80		Honey.
9014	0.16	18.35	-15.0	18.0	2.30		do.
9273	0.12	16.65	-18.4	20.4	1.53		do.
9277	0.14	19.98	-14.8	20.4	4.30		do.

milk ice cream or gum ice cream (as the case may be); or if a placard bearing the following statement—

“Imitation ice cream is served here.

“Compound ice cream is served here.

“Egg ice cream is served here.

“Gelatine ice cream is served here.

“Milk ice cream is served here, or

“Gum ice cream is served here

(as the case may be), shall be posted in a conspicuous place in the room where any and all persons may see the same when purchasing cream; and, provided further, that the statement on the placard is printed in plain black letters, not less than one inch in size, on a white background.”

Of samples of ice cream and ice cream substitutes 41 were examined, of which 8 were standard or practically so, and 33 were below standard. A few of those below standard were reasonably good products, containing from 10 to 12 per cent of milk fat, but the larger part of them were very poor substitutes for ice cream, many of them containing only from 3 to 5 per cent of milk fat, and were adulterated with gelatine, so-called ice cream powders, etc.

Many of these inferior products were sold under the Board ruling quoted above, and the purchaser knew that he was not getting ice cream. That is a fair proposition. If one wishes to buy an inferior product, he has a right to do so, and this Department has no objection to the sale, provided that the dealer makes known to the purchaser what he is getting for his money. On the other hand, if the purchaser wishes a good product, he has a right to know what he is

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9316	Ice-cream, Peach.....		R. Blacknall, Durham.....
9308	Ice-cream, Strawberry.....		Candy Kitchen, Goldsboro.....
9307	Ice-cream, Vanilla.....		do.....
9303	do.....	Fussell Ice-Cream Co., Norfolk, Va.	D. H. Creech, Smithfield.....
9319	do.....		Five Points Drug Co., Durham..
9038	do.....		Goldsboro Candy Kitchen, Goldsboro.
9305	Ice-cream, Chocolate.....		Goldsboro Drug Co., Goldsboro.
9306	Ice-cream, Vanilla.....		do.....
9288	do.....	N. W. Griffin Ice-Cream Co., Charlotte, N. C.	N. W. Griffin Ice-Cream Co., Charlotte.
8494	Ice-cream, Chocolate.....		Hicks-Bunting Drug Co., Wil- mington.
9321	Ice-cream, Vanilla.....		Henry T. Hicks Co., Raleigh....
9285	do.....		J. H. Hahn, Charlotte.....
9315	do.....		Haywood & Boone, Durham..
9394	Ice-cream, Chocolate.....		Imperial Pharmacy, Goldsboro
9289	Ice cream, Strawberry.....		Will Jones, Charlotte.....
9286	Ice-cream, Vanilla.....		Peter Kernazes, Charlotte.....
9318	do.....		C. D. King & Son, Durham....
9322	do.....		King-Crowell Drug Co., Raleigh
9297	Ice-cream, Comp. Chocolate.	Smith Ice-Cream Co., Greensboro	W. A. Mabry, Durham.....
9298	Ice-cream, Peach, Comp.	do.....	do.....
9320	Ice-cream, Chocolate.....		Main Street Pharmacy, Durham
9309	Ice-cream, Vanilla.....		Palace Pharmacy, Goldsboro..
9290	do.....		James Panagakes, Charlotte...
9310	do.....		Jno. O. Royall & Co., Goldsboro
9311	Ice-cream, Chocolate.....		do.....
9312	Ice-cream, Caramel.....		do.....
9317	Ice-cream, Vanilla.....		Rexall Pharmacy, Durham.
9287	do.....	Brannan & Hahn, Charlotte	J. T. Sanders, Charlotte.....
9302	Ice-cream, Peach.....		Snead-Umstead Co., Durham
9301	Ice-cream, Vanilla.....		do.....

getting. Many of these so-called ice creams, being below standard and adulterated, were sold without making that fact known to the purchaser. They were sold for ice cream when they were adulterated and were sold in violation of the law, notwithstanding, the Department has for several years been trying to bring the dealers to see the necessity for honest dealing. When they are prosecuted for these violations they will only have themselves to blame.

ICE CREAM AND ICE CREAM SUBSTITUTES.

Laboratory Number	Fat, Milk— Per Cent	Solid Matter, not Fat— Per Cent	Total Solid Matter— Per Cent	Remarks and Conclusions
9316	8.67	23.38	32.05	Ice-cream below standard; no sign; sale illegal.
9308	13.70	19.59	33.29	Ice-cream, slightly below standard.
9307	13.81	14.81	28.62	do.
9303	10.63	17.73	28.36	Ice-cream, below standard; no sign; sale illegal.
9319	4.32	18.85	23.17	Ice-cream, below standard; sign up.
9038	19.76	-----	-----	Ice-cream. Sample sent to the Department for analysis by dealer.
9305	5.26	33.39	38.65	Ice-cream, below standard; sign up.
9306	4.81	17.62	22.43	do.
9288	5.58	19.69	26.27	do.
8494	12.79	-----	-----	Ice-cream, chocolate, below standard; sale illegal. Sample sent to the Department for analysis by dealer.
9321	16.07	17.03	33.10	Ice-cream.
9285	11.17	22.95	34.12	Ice-cream, below standard; sign up.
9315	5.35	18.14	23.49	Ice-cream, below standard; no sign; sale illegal.
9304	6.88	28.41	35.29	do.
9289	4.42	23.95	28.37	do.
9286	10.50	20.64	31.14	do.
9318	3.73	19.11	22.84	Ice-cream, compound, below standard; no sign; sale illegal
9322	17.69	14.13	31.82	Ice-cream.
9297	9.38	20.09	29.47	Ice-cream, compound; sign up.
9298	9.83	14.28	24.11	do.
9320	4.19	25.54	29.73	Ice-cream, below standard; sign up.
9309	2.10	28.04	30.14	Ice-cream, compound, very inferior quality; sign up.
9290	8.44	22.77	31.21	Ice-cream, below standard; no sign; sale illegal.
9310	3.86	27.96	31.82	Ice-cream, compound, inferior quality, though "pure ice-cream" is advertised in place of business; no sign; sale illegal.
9311	3.89	26.91	30.80	do.
9312	3.49	24.38	27.87	do.
9317	2.99	23.32	26.31	Ice-cream, compound, very low in fat; sign up
9287	10.43	20.67	31.10	Ice-cream, below standard; no sign; sale illegal
9302	7.96	21.70	29.66	do.
9301	10.66	16.01	26.67	do.

RESULTS OF THE EXAMINATION OF ICE CREAM

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9300	Ice-cream.....		P. N. Vaughn, Durham.....
9314	Ice-cream, Peach.....		W. M. Yearby, Durham.....
9299	Ice-cream, Vanilla.....		do.....
9459	do.....		California Fruit Store, Raleigh..
9460	Ice-cream, Chocolate....		do.....
9461	Ice-cream, Sherry.....		J. C. Brantley, Raleigh.....
9462	Ice-cream, Vanilla.....	Henry T. Hicks Co., Raleigh, N. C.	Wake Drug Co., Raleigh.....
9463	do.....		Dughi Ice-Cream Co., Raleigh..
9465	Ice-cream, Compound, Vanilla.....		Furman Betts, Raleigh.....
9559	Ice-cream, Pineapple.....		Dughi Ice-Cream Co., Raleigh..
9560	Ice-cream, Compound, Vanilla.....		Furman Betts, Raleigh.....

MAPLE SIRUP.

Sirup is the sound product made by purifying and evaporating the juice of a sugar-producing plant without removing any of the sugar.

Maple sirup is sirup made by the evaporation of maple sap or by the solution of maple concrete, and contains not more than 32.00 per cent of water and not less than 0.45 per cent of maple sirup ash.

Formerly maple sirup was adulterated with glucose sirup, etc., the maple flavoring being imitated by the addition of an extract of maple, hickory or some other bark with a similar flavor; but for some years

RESULTS OF THE EXAMINATION OF MAPLE

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9003	Maple Sirup, Twin Star....	Crane, Clarence A., Warren, Ohio..	J. W. Allsbrook, Scotland Neck
8487	Maple Sirup, Blue Label..	Curtice Bros. Co., Rochester, N. Y.	White Star Co., Winston-Salem..
8997	Maple Sirup, Our Pride*....	Gast-Crofts Co., Louisville, Ky....	Peoples Grocery Co., Oxford, N. C.
9245	Maple Sirup, Our Best....	Goodwin Preserving Co., Louisville, Ky.	C. Scott & Co., Greensboro....
9244	do.....	do.....	Tucker & Erwin, Greensboro....
9243	do.....	do.....	J. H. Low, Greensboro.....
9242	do.....	do.....	Campbell & Morris, Charlotte
8489	Maple Sirup, A. & P.....	Great Atlantic and Pacific Tea Co., Jersey City, N. J.	Atlantic and Pacific Tea Co., Greensboro.
9007	Maple Sirup.....	Hirsch Bros., & Co. Louisville, Ky.	Tarboro Grocery Co., Tarboro

* Samples taken from old stock

AND ICE CREAM SUBSTITUTES—*Continued.*

Laboratory Number	Fat, Milk— Per Cent	Solid Matter, not Fat— Per Cent	Total Solid Matter— Per Cent	Remarks and Conclusions
9300	2.49	24.42	26.91	Ice-cream, compound, very low in fat; sold as compound.
9314	3.97	19.87	23.84	Compound peach ice-cream, low in fat; sign up.
9299	3.31	15.80	19.11	Ice-cream, below standard; sign up.
9459	15.27	14.40	29.37	Ice-cream.
9460	14.32	17.19	31.52	do.
9461	14.30	14.75	29.05	do.
9462	13.49	17.33	30.82	Ice-cream, very slightly below standard.
9463	6.65	16.44	23.09	Ice-cream, below standard; no sign; sale illegal.
9465	4.99	17.03	22.03	Ice-cream, below standard; sign up.
9559	7.67	-----	-----	Ice-cream, below standard; no sign; sale illegal.
9560	5.14	-----	-----	Ice-cream, below standard; sign up.

the chief adulteration has consisted in the addition of refined sugar sirup, the maple sirup present being depended on to flavor the whole, though the maple flavor is often reinforced by the addition of an extract of bark or an imitation flavor. Since pure maple sirup consists largely of ordinary sugar, the direct detection of added sugar sirup is, of course, impossible, but its presence is easily shown by the determination of minor constituents which occur in maple products only.

Twenty samples of maple sirup and substitutes for the same were examined, nine of which were adulterated or misbranded and two were not properly labeled. (See table below.)

SIRUPS AND COMPOUND MAPLE SIRUPS.

Laboratory Number	Total Ash— Per Cent	Water— Per Cent	Dry Matter— Per Cent	Lead Number (Hortvet)	Lead Number (Winton)	Remarks and Conclusions
9003	0.57	34.51	65.49	1.74	-----	Maple sirup, per cent of water little high.
8487	0.67	31.16	68.84	1.86	-----	Maple sirup.
8997	0.43	41.24	58.76	0.47	0.25	Maple sirup adulterated with syrup other than maple sirup, misbranded, per cent of water high; sale illegal.
9245	0.16	24.50	75.50	0.11	0.02	Maple sirup containing other sirup, misbranded; sale illegal.
9244	0.20	33.27	66.73	0.03	0.41	do.
9243	0.38	31.82	68.18	2.44	0.81	Maple sirup containing small amount of other sirup, misbranded; sale illegal.
9242	0.17	27.82	72.18	0.17	0.24	Maple sirup containing other sirup, misbranded; sale illegal.
8489	0.75	31.91	68.09	1.21	-----	Maple sirup.
9007	0.89	33.03	66.94	1.72	1.83	do.

RESULTS OF THE EXAMINATION OF MAPLE SIRUPS

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9002	Maple Sirup.....	Hirsch Bros. & Co., Louisville, Ky.	Barbee & Elliot, Durham.....
9055	Sirup, Gold Leaf.....	Huntington Maple Sirup and Sugar Co., East Providence, R. I.	Rudy & Buffaloe, Raleigh.....
9241	Maple Sirup, Vermont*.....	Knadler & Lucas, Louisville, Ky.	Dorster & Dorster, Monroe.....
8999	Maple Sirup, Old Manse*.....	William R. Manierre.....	L. Thomas, Oxford.....
8998	Maple and Cane Sirup.....	Phila. Pickling Co.....	do.....
8995	Maple Sirup, Colonial.....	Rigney & Co., Brooklyn, N. Y.....	W. R. Dorsett & Co., Raleigh....
8996	Maple Sirup and Rock Candy.....	do.....	do.....
9000	do.....	do.....	Johnson & Hewitt, Durham....
9001	Maple & Cane Sirup, Seud- der's.....	Seudder Sirup Co., Chicago, Ill.....	T. M. Stephens, Durham.....
8488	Maple Sirup.....	Welch Bros., Burlington, Vt.....	Patterson Bros., Greensboro.....
9056	Breakfast Sirup, Robin Hood.....	Williams, R. C., & Co., New York, N. Y.	Rudy & Buffaloe, Raleigh.....

* Samples taken from old stock.

MISCELLANEOUS SAMPLES.

Under this head is reported the results of a few samples, which, except Nos. 8593, 8594, and 8596, sardines, were sent to the Depart-

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9282	Beverage*.....		A. T. Gardner, Mayor, Beaufort.....
8993	Cream*.....		E. M. Muse, Cary.....
8947	do*.....		do.....
8517	do*.....		J. Hicks Bunting, Wilmington....
8573	do*.....		Patterson Drug Co., Wilson.....
8607	Imitation Cider*.....		J. H. Folger, Mayor, Mt. Airy.....
9018	do*.....		W. N. Gibson, Red Springs.....
8559	do*.....		H. S. Harrison, Enfield.....
8587	Grape juice*.....		W. S. Edwards, Lemon Springs.....
9010	Meat*.....		H. S. Leard, Raleigh.....
8946	Milk*.....		Dr. Jno. A. Ferrell, Raleigh.....
8616	do*.....		E. T. Lewis, Middlesex.....

* Sample sent to Department for analysis

AND COMPOUND MAPLE SIRUPS—*Continued.*

Laboratory Number	Total Ash—Per Cent	Water—Per Cent	Dry Matter—Per Cent	Lead Number (Hortvet)	Lead Number (Winton)	Remarks and Conclusions
9002	0.30	37.00	63.00	0.92	0.40	Maple sirup adulterated with other sirup; per cent of water too high; sale illegal.
9055	0.15	30.50	69.50	0.52	.....	Compound cane and maple sirup.
9241	0.16	34.85	65.15	0.03	0.08	Maple sirup containing sirup other than maple sirup; adulterated and misbranded; sale illegal.
8999	0.18	35.56	64.44	0.84	0.21	Maple sirup containing other sirup; adulterated and misbranded; water high; not properly labeled; sale illegal.
8998	0.10	28.00	72.00	1.29	1.01	Compound maple and cane sirup; not properly labeled.
8995	0.58	34.81	65.19	1.97	.....	Maple sirup.
8996	0.14	35.03	64.97	0.49	.....	Compound of cane and maple sirup, misbranded; It is labeled a blend when it is a compound; sale illegal.
9000	0.11	33.98	66.02	0.30	0.10	do.
9001	0.16	31.68	68.32	0.56	.....	Compound maple and cane sirup.
8488	0.55	33.66	66.34	1.25	.....	Maple sirup.
9056	0.39	30.35	69.65	0.41	.....	A compound of cane and maple sirups.

ment for analysis. Being only a few samples of each kind, for convenience they are grouped under the head of miscellaneous samples, and the results are published in the table below.

MISCELLANEOUS SAMPLES EXAMINED.

Laboratory Number	Results of Analysis	Remarks and Conclusions
9282	Alcohol 10.32 per cent.....	An alcoholic beverage.
8993	Fat, milk, 32.50 per cent.....	Cream.
8947	Fat, milk, 20.00 per cent.....	do.
8517	Fat, milk, 18.50 per cent.....	do.
8573	Fat, milk, 25.00 per cent.....	do.
8807	Alcohol, 13.25 per cent.....	Seems to be a tonic or medicinal preparation, though the medicinal properties were not tested for.
9018	Alcohol, 6.97 per cent.....	Imitation cider, intoxicating.
8559	Alcohol, 6.00 per cent.....	Imitation cider, intoxicating. The product cannot be sold as cider. If sold it must be sold as imitation cider.
8587	.....	Imitation grape juice.
9010	.....	Beef; examined for chemical preservatives, but none found.
8946	{ Fat, milk, 3.13 per cent..... Proteids, 0.77 per cent..... Solids, 11.56 per cent..... Water, 88.44 per cent..... }	
8616	.....	Milk; examined for chemical preservatives; results negative. Sample was sour.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9027	Milk*		Mrs. Jas. I. Miller, Montreat.....
8515	do*		Alex. Webb, Raleigh.....
9284	do*		Mrs. S. C. Whitaker, Raleigh.....
9130	Phosphate*	Carolina Vinegar Co., Tarboro, N. C.	F. P. Pulley, Tarboro.....
8596	Sardines		Davis & Sons, Henderson.....
8594	do.....	North Lubec Mfg. Co., North Lubec, Maine.	A. A. Bullock, Henderson.....
8593	do.....	Oberndorfer & Co., Norfolk, Va.	do.....
9249	Imitation Cider*		W. C. Harris, Raleigh.....

* Samples sent to the Department for analysis.

MOLASSES AND SIRUPS.

Molasses is the product after separating the sugar from massecuite, melada, mush sugar or concrete.

Molasses that is compounded or mixed with glucose, or any other substance, to cheapen or lower its quality, must be labeled molasses compound or imitation molasses, or it must name the ingredients in the compound.

As Cuba, Porto Rico, Mayaguez, Antigua, Barbadoes, St. Kitts, etc., are names of either West India Islands or towns and cities on those islands, molasses must not be branded any of these or any other distinctive name of a place unless it is actually produced from the place named.

As it appears that the word "style" used in connection with the brand name of molasses, as "Barbadoes Style," etc., is misleading and deceptive, it must not be used with the brand name of molasses.

RESULTS OF EXAMINATION

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9107	Molasses.....	Covington, C. C., Wilmington, N. C.	M. A. Bethune, Fayetteville.....
9106	do.....	Dunn & Co., Fayetteville, N. C.	J. F. Powers & Son, Fayetteville.
9247	Cane and Corn Sirup. Gayco.*	Gay, C. B., & Co., Jacksonville, Fla.	M. C. Mayer Grocery Co., Charlotte.
9108	Molasses.....	Blackburn-Morris Co., New Orleans, La.	M. A. Bethune, Fayetteville.....

* Sent to the Department for analysis.

MISCELLANEOUS SAMPLES EXAMINED—*Continued.*

Laboratory Number	Results of Analysis	Remarks and Conclusions
9027	{ Water, 88.16 per cent..... { Total solids, 11.84 per cent..... { Fat, milk, 3.20 per cent..... { Fat, milk, 4.60 per cent..... { Solid matter, 14.80 per cent.....	Milk; low in fat.
8515		Milk, good quality.
9284	Fat, milk, 5.50 per cent.....	Milk; fat content high
9130	Alcohol, none found.....	
8596	.....	Sardines in olive oil.
8594	.....	Sardines, in cotton seed oil
8593	.....	Sardines, in peanut oil.
9249	Alcohol (by volume), 43.67 per cent....	

Sugar-cane sirup is sirup made by the evaporation of the juice of the sugar-cane or by the solution of sugar-cane concrete.

Sorghum sirup is sirup made by the evaporation of sorghum concrete.

Molasses, molasses compounds, sirups, compound sirups, etc., must be labeled what they are.

Whatever is required on the principal label of a package of molasses, molasses compound, sirup or compound sirup, must appear on one end or head of the barrel or cask; and if the principal label, or any part of it, appears on both ends of the barrel or cask they shall be identical, one to the other. Retail dealers, while offering molasses for sale, must keep the label so that it can be seen by purchasers, and so kept that it will remain legible. Molasses, molasses compounds, sirups, compound sirups, etc., must be truthfully labeled.

Only 6 samples of molasses and sirups were examined. The results are published in the table below.

OF MOLASSES AND SIRUPS.

Laboratory Number	Water— Per Cent	Dry Matter— Per Cent	Glucose— Per Cent	Adulterants	Remarks and Conclusions
9107	27.69	72.31	None found.....	None found.....	Molasses.
9106	26.39	73.61	.....do.....	.....do.....	do.
9247	29.00	71.00	.....do.....	.....do.....	Corn and cane sirup, slightly fermented; exact amount sucrose and glucose could not be determined.
9108	21.36	78.64	None found.....	.....do.....	Molasses; from low polarization it appears to be a low grade product; bleached.

RESULTS OF EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8589	Melasses*		Madison Grocery Co., Madison..
9116	Sirup, Gayco*		J. C. Stevenson & Co., Wilmington.

* Samples sent to Department for analysis.

OLIVE AND OTHER TABLE AND COOKING OILS.

Olive oil is the oil obtained from the sound, mature fruit of the cultivated olive tree. It is a very choice table oil and is largely used. It was formerly much adulterated, but the enforcement of the food laws has reduced the adulteration of it to a minimum.

Cotton seed oil is the oil obtained from the sound, mature seed of the cotton plant. It is being highly refined and becoming very popular for both table and cooking purposes. When properly manufactured and refined it is a clean, wholesome product, and deserves the good name it has. However, that the purchaser may know exactly what he

RESULTS OF THE EXAMINATION OF OLIVE

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9122	Salad Oil*	American Preserve Co., Philadelphia, Pa.	Sternberger Bros., Wilmington...
8592	Olive Oil.....	Antrim, C. W., & Sons, Richmond, Va.	Breedlove & McFarland, Oxford
9235	Salad Oil, Atlantic.....	Great Atlantic and Pacific Tea Co., Jersey City, N. J.	Great Atlantic and Pacific Tea Co., Greensboro.
9123	Olive Oil, E & E.....	Eddy & Eddy, St. Louis, Mo.....	G. H. Bornemann's, Wilmington.
8556	Olive Oil, Dove.....	Frank Tea and Spice Co., Cincinnati, Ohio.	W. R. Dorsett & Co., Raleigh ...
9121	Oil de Salad, Regina.....	Hirsch, Chas. L., & Co., New York, N. Y.	Sternberger Bros., Wilmington...
8834	Olive Oil.....	Hirsch Bros. & Co., Louisville, Ky.	W. B. Strickland, Scotland Neck.
9236	Salad Oil.....	Horton-Cato Mfg. Co., Detroit, Mich.	Lynch Bros., Greensboro
9118	Salad Oil, Gold Medal.....	Israel, Chas., & Bro., New York, N. Y.	H. W. Konig, Wilmington.....
8826	Olive Oil.....	Lehn & Fink, New York, N. Y.....	May & Gorham, Rocky Mount...
9124	Olive Oil, Libby's.....	Libby, McNeill & Libby, Chicago, Ill.	J. S. Westbrook, Wilmington.....
9119	Olive Oil.....	Loubon, E., Nice, France.....	W. H. Turley, Wilmington.....
9120	Table Oil	do.....	Sternberger Bros., Wilmington...
9117	Olive Oil, Bandor.....	McMonnies & VonElms, New York	Peoples Supply Co., Wilmington

* Sample from old stock.

MOLASSES AND SIRUPS—*Continued.*

Laboratory Number	Water— Per Cent	Dry Matter Per Cent—	Glucose— Per Cent.	Adulterants	Remarks and Conclusions
8589					Molasses; bleached with sulphur dioxide, but within limit of the law. Compound corn and cane sirup. Sample had fermented, which caused results of the analysis to be less accurate. Sample contains about 75 per cent glucose.
9116					

is getting, it should be plainly labeled cotton seed oil. There is no need for it to sail under false colors.

Twenty-three samples of these products were examined, twelve of which proved to be olive oil and eleven proved to be cotton seed oil. Fourteen of them were branded olive oil, two of which, Nos. 9119 and 9229 proved to be cotton seed oil and were misbranded. To prevent deception these products should be plainly labeled "olive oil" or "cotton seed oil" as the case may be, for the purchaser has the right to know what he is getting. No. 9121 was labeled "oil de salad" and the label bore a picture of a cluster of olives, a design which was deceptive. The product was misbranded, and sold in violation of the law.

AND OTHER TABLE AND COOKING OILS.

Laboratory Number	Reading Refractometer, 15.5°C.	Refractive Index	Specific Gravity 15.5°C.	Halphen Test for Cotton Seed Oil	Remarks and Conclusions
9122	73.99	1.4746	0.9225	Positive....	Cotton seed oil; the label should show it to be cotton seed oil.
8592	67.07	1.4704	0.9155	Negative..	Olive oil.
9235	73.00	1.4741	0.9224	Positive....	Cotton seed oil. Sample was branded "salad oil," and stated also "cotton seed oil." Salad oil should plainly state kind of oil it is.
9123	66.99	1.4704	0.9165	Negative ..	Olive oil; not properly labeled, did not show name of material.
8556	65.22	1.4692	0.9150	.....do.....	Olive oil.
9121	73.50	1.4744	0.9226	Positive....	Cotton seed oil, misbranded; design on label deceptive, label should show kind of oil it is; sale illegal.
8834	66.67	1.4700	0.9167	Negative...	Olive oil.
9236	73.80	1.4746	0.9229	Positive....	Cotton seed oil, label should show kind of oil it is.
9118	72.83	1.4739	0.9227	Positive....	Cotton seed oil, and so stated on label.
8826	66.57	1.4704	0.9170	Negative...	Olive oil, from which all the solid matter has not been removed by proper filtration.
9124	67.99	1.4710	0.9163	.....do.....	Olive oil.
9119	72.41	1.4737	0.9225	Positive....	Cotton seed oil, misbranded; sale illegal.
9120	72.70	1.4739	0.9227	Positive....	Cotton seed oil, and should be so labeled.
9117	67.83	1.4708	0.9169	Negative...	Olive oil.

RESULTS OF THE EXAMINATION OF OLIVE AND

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9231	Olive Oil.....	Price, L. A., Bordeaux, France.....	J. E. C. Hill, Wadesboro.....
9229	Olive Oil, Lucca.....	Rae, S., & Co., Leghorn, France.....	Planters Trading Co., Laurinburg.....
9237	Salad Oil.....	Ritter, Philip J., Conserve Co., Philadelphia, Pa.....	Chas. E. Pugh, Greensboro.....
8558	Wesson Oil.....	Southern Cotton Oil Co., Savannah, Ga.....	W. R. Dorsett & Co., Raleigh.....
8557	Olive Oil, La Rose Blanche.....	Seeman Bros., New York.....	A. S. Womble, Raleigh.....
9234	Salad Oil, Emerson.....	Vagt, R., Brooklyn, N. Y.....	Hudson Grocery Co., Greensboro.....
8825	Olive Oil, Du Paix.....	.....	Barnes & Graves, Wilson.....
9232	Olive Oil, Huile Superieure.....	.....	Bruner & Huey, Monroe.....
9391	Olive Oil, Duraix.....	.....	H. J. Johnson, Raleigh.....

OYSTERS.

Seventeen samples of oysters were examined, two of which were canned

RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8613	Oysters, Canned, Mariner ..	Breslauer-Lachicotte & Co., Waverly Mills, S. C.	E. B. Liles, Rockingham.....
8617	Oysters.....	Isaac Fass, Portsmouth, Va.....	D. B. Wade, Raleigh
8552	do.....	do.....	do.....
8551	do.....	do.....	C. D. Arthur, Raleigh.....
8603	do.....	Isaac Fass, Norfolk, Va.....	C. E. Newells, Raleigh.....
8612	Oysters, Canned.....	Little Neck Can Co., Beaufort, N. C.	Pierce & Ford, Henderson.....
8619	Oysters.....	J. W. Marshall, West Point, Va.....	L. M. Waring, Raleigh.....
8550	do.....	do.....	do.....
8602	do.....	do.....	do.....
8604	do.....	W. O. Montgomery, Belhaven, N. C.	C. D. Arthur, Raleigh.....
8614	Oysters, Canned, Princess ..	W. H. Roberts & Co., Baltimore, Md.	J. H. Tice, Wadesboro.....
8553	Oysters.....	D. B. Wade & Son, Morehead City, N. C.	D. B. Wade, Raleigh.....
8554	do.....	A. L. Willis, New Bern, N. C.....	Britton Pierce, Raleigh.....
8555	do.....	do.....	W. R. Miller, Raleigh.....
8601	do.....	do.....	Britton Pierce, Raleigh.....
8605	do.....	do.....	W. R. Miller, Raleigh.....
8618	do.....	do.....	Britton Pierce, Raleigh.....

OTHER TABLE AND COOKING OILS—*Continued*

Laboratory Number	Reading Refractometer, 15.5°C.	Refractive Index	Specific Gravity 15.5°C.	Halphen Test for Cotton Seed Oil	Remarks and Conclusion
9231	67.40	1.4706	0.9163	Negative ..	Olive oil
9229	62.50	1.4675	0.9164	.....do.....	do.
9237	73.30	1.4742	0.9232	Positive....	Cotton seed oil, and should be so labeled
8558	72.22	1.4735	.....do.....	.....do.....	Cotton seed oil.
8557	65.22	1.4692	0.9160	Negative...	Olive oil.
9234	72.50	1.4738	0.9223	Positive....	Cotton seed oil, and so stated
8825	68.55	1.4700	0.9161	Negative...	Olive oil, not properly labeled; should show name and address of manufacturer or jobber.
9232	73.50	1.4744	0.9230	Positive....	Cotton seed oil, sold as olive oil; misrepresented and not properly labeled; sale illegal.
9391	65.80	1.4696	0.9155	Negative...	Olive oil, should show name and address of manufacturer or jobber.

and fifteen were fresh. No adulteration was found.

NATION OF OYSTERS.

Laboratory Number	Preservatives	Adulterants	Remarks and Conclusion
8613	None found.....	None found.....	Oysters, canned
8617	.....do.....	.....do.....	Oysters, fresh
8552	.....do.....	.....do.....	do.
8551	.....do.....	.....do.....	do.
8603	.....do.....	.....do.....	do.
8612	.....do.....	.....do.....	do.
8619	.....do.....	.....do.....	do.
8550	.....do.....	.....do.....	do.
8602	.....do.....	.....do.....	do.
8604	.....do.....	.....do.....	do.
8614	.....do.....	.....do.....	Oysters, canned
8553	.....do.....	.....do.....	Oysters, fresh
8554	.....do.....	.....do.....	do.
8555	.....do.....	.....do.....	do.
8601	.....do.....	.....do.....	do.
8605	.....do.....	.....do.....	do.
8618	.....do.....	.....do.....	do.

RICE.

Only three samples of rice have been examined during the year, two of which were coated with glucose and talc and one was not. Sample No. 8809 was coated without the fact being stated on the label. Sample No. 8811 was coated and the fact was stated on the back of the pack-

RESULTS OF THE EXAMI-

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8809	Rice, Coronet	Fischer, B., & Co., New York, N. Y.	Barnes-Graves Grocery Co., Wilson.
8810	Rice, Evergreen	Kenny, C. D., Co., Baltimore, Md.	J. D. Traylor, Edenton.
8811	Rice, Merit Head Rice	Tiedmann, The, Co., Charleston, S. C.	J. D. Lee, Wilson.

SODA WATER, BOTTLED.

Bottled soda waters are made by the addition of water to a sirup prepared for the purpose, and carbonating the same by forcing carbon dioxide gas into it. The bottling process is comparatively simple, but is badly abused because much of the business is in ignorant and incompetent hands. Many cases of fever and other diseases may originate from the contaminated water supply and other filthy conditions of bottling plants. They are often conducted in back lots, adjoining horse

RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8798	Soda Water, Banana	Belhaven Bottling Works, Belhaven, N. C.	U. W. Tarkington, Belhaven
8801	Soda Water, Lemon Sour	Edenton Bottling Works, Edenton, N. C.	C. V. Williford, Hertford, N. C.
8802	Soda Water, Lemon Soda	do	do
8794	Soda Water, Strawberry	Pepsi-Cola Bottling Works, Wilson, N. C.	T. R. Lamm, Wilson
8795	Soda Water, Orange	do	do
8796	Soda Water, Imitation Strawberry	Pepsi-Cola Bottling Works, Tarboro, N. C.	Y. D. Garrett, Tarboro
8799	Soda Water, Strawberry	S. W. Waters & Co., Elizabeth City, N. C.	R. B. White, Elizabeth City
8800	Soda Water, Cherry	do	do
8803	Soda Water, Vanilla	do	do
9024	Soda Water, Sherry Ginger Ale	do	L. M. McCormick, Asheville
8797	Apple Cider (Bottled)	Belhaven Bottling Works, Belhaven, N. C.	U. W. Tarkington, Belhaven
8804	Apple Cider, Purity Brand (Bottled)	Pepsi-Cola Bottling Works, Tarboro, N. C.	H. N. Cherry, Tarboro

* Sent to the Department for analysis.

age in very small type, in connection with a good deal of other printed matter, where hardly any one would see it who was not making a close search for it. Under the law it was misbranded. The Food Law requires that such information shall be on the principal label and in type at least half the size of the type in the principal words on the label.

NATION OF RICE.

Laboratory Number	Remarks and Conclusions
8809	Rice, coated with glucose and tale and the fact not stated on label; sale illegal.
8810	Rice.
8811	Rice coated with glucose and tale. The statement "coated with glucose and tale" should be on the principal label; sale illegal.

stables, and use water from the back-lot wells that are subject to contamination of the most dangerous kind. It is realized that inspection should be made of all such plants, and that they should be required to be operated and kept in a sanitary condition, so that they would not endanger the health and lives of the public; but funds with which to do this work are not available.

Twelve samples of bottled soda waters were examined, ten of which were adulterated or misbranded, and the sale of which was illegal.

OF BOTTLED SODA WATERS.

Laboratory Number	Alcohol— by Volume— Per Cent	Remarks and Conclusions
8798		Imitation banana soda water, misbranded; was branded "banana soda water" when it is not banana, but imitation banana flavor; sale illegal.
8801		Imitation lemon sour, misbranded; was branded "lemon sour colored." It contained no lemon.
8802		Imitation lemon soda water, misbranded; was branded "lemon soda" when it was imitation, and contained no lemon.
8794		Soda water, misbranded, and not properly labeled. It was branded "strawberry" when it was not strawberry, but was soda water with artificial strawberry flavor; sale illegal.
8795		Imitation orange soda water, misbranded; was branded "orange" when it was soda water with imitation orange flavor; sale illegal.
8796		Imitation strawberry soda water.
8799		Imitation strawberry soda water, misbranded; was branded "strawberry" when it was an imitation strawberry flavor; sale illegal.
8800		Imitation cherry soda water, misbranded; was branded "superior quality cherry" when it was imitation cherry soda water and not of superior quality; sale illegal.
8803		Imitation vanilla soda water, misbranded; was branded "vanilla" when it contained no extract of vanilla, but an imitation vanilla; sale illegal.
9024	1.90	Soda water.
8797	0.07	Soda water, misbranded. The product was not apple cider; sale illegal.
8804	0.17	do.

SWEET OIL.

Sweet oil is olive oil. However, there seems to be some difference of opinion as to what really constitutes a sweet oil, and what can correctly be labeled and sold as sweet oil. The name sweet oil does not occur in the pharmacopœia, therefore we have to go elsewhere for a definition. The Board of Food and Drug Inspection of the Bureau of Chemistry, United States Department of Agriculture, have held that "sweet oil" is olive oil. The United States Dispensatory defines and describes sweet oil as olive oil. Most of the State Food and Drug officials hold that sweet oil is olive oil. On the other hand some very prominent druggists think that cotton seed oil can be properly branded sweet oil. Apparently their principal reason for so thinking is that for some years it has been branded and sold as sweet oil. This Department does not in any way wish to discriminate against cotton seed oil. It is a good product and justly deserves the good name it bears, but it is either sweet oil or it is not sweet oil. If it is sweet oil then olive oil is not

RESULTS OF THE EXAMINATIONS.

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9125	Cotton Seed Oil.....	Ahrens Bros., Wilmington, N. C.	William Crownstream, Wilmington.
8833	Sweet Oil.....	Bailey, James, & Son, Baltimore, Md.	Branning Mfg. Co., Edenton...
9126	do.....	Bellamy, Robt. R., Wilmington, N. C.	J. P. Montgomery, Wilmington.
9214	Sweet Oil, Peacock.....	Bristol Drug Mfg. Co., Bristol, Va.	R. B. Terry, Hamlet.....
8907	Sweet Oil.....	Burwell & Dunn, Charlotte, N. C.	A. W. Porter & Co., Rockingham
9223	Sweet Oil, S.....	do.....	W. A. Jamison, Charlotte.....
8829	Sweet Oil, Keeler's.....	Carr-Owens & Co., Baltimore, Md.	Tarboro Grocery Co., Tarboro.
9228	Sweet Oil, Cumberland....	Cumberland Mfg. Co., Nashville, Tenn.	O. F. Pearce, Greensboro.....
9224	Sweet Oil, C. C. C.....	Clotworthy Chemical Co., Baltimore, Md.	J. S. Shinley, High Point.....
8831	Sweet Oil, Phoenix.....	Crawford, W. H., Co., Baltimore, Md.	Pamlico Grocery Co., Washington.
9225	Sweet Oil.....	Frank Tea and Spice Co., Cincinnati, Ohio.	J. S. Skinley, High Point.....
9219	Sweet Olive Oil, Gilbert's..	Gilbert Bros. & Co., Baltimore, Md.	W. R. Woodson, Salisbury.....
9379	Olive Oil (Sweet Oil).....	Goldsboro Drug Co., Goldsboro, N. C.	Goldsboro Drug Co., Goldsboro
8828	Sweet Oil.....	Heekin Spice Co., Cincinnati, Ohio.	J. B. Cummings, Tarboro.....
9217	Sweet Oil, Red Cross.....	I. C. Co., Baltimore, Md.	W. G. Lowry, Rockingham.....
9227	Sweet Oil, Justice's.....	Justice Drug Co., Greensboro, N. C.	Tucker & Erwin, Greensboro....
8908	Sweet Oil.....	Marsh, M. L., Concord, N. C.	Correll & Stratford, Concord...
9128	Sweet Oil, Reliable.....	McCormick & Co., Baltimore, Md.	L. H. Caldwell, Lumberton.....
8909	Sweet Oil, Crown*.....	do.....	G. W. Goodwyn, Laurinburg....
9215	Sweet Oil, Reliable.....	do.....	do.....
9221	Sweet Oil, N. P. D.....	Norman-Perry Drug Co., Winston-Salem, N. C.	A. L. Sink, Lexington.....

* Sample from old stock

sweet oil. If olive oil is sweet oil then cotton seed oil is not. A consumer has a right to know, from the name under which he purchases a simple product, what he is getting. With both olive oil and cotton seed oil known as sweet oil much confusion would arise, and a purchaser would never know what he is getting. Olive oil was known as sweet oil before cotton seed oil was prepared and discovered to be of any use. Cotton seed oil is probably just as good for the purposes for which sweet oil is used as olive oil. If it is, then use it for those purposes, but sell it under its own good name and let it have the credit due it. Label it cotton seed oil with such explanation, in smaller type on the label, as is necessary to convey the proper information to the consumer.

Under the head of sweet oil 33 samples were examined, 27 of which were misbranded, and 3 of the latter were not properly labeled.

In regard to the misbranding of these samples, it is but justice to say that the manufacturers of many of these products were acting in good faith and believed that they were branding their goods properly, and complying with the law.

NATION OF SWEET OILS.

Laboratory Number	Reading Refractometer, at 15.5°C.	Refractive Index	Specific Gravity 15.5°C.	Hallphen Test for Cotton Seed Oil	Remarks and Conclusions
9125	72.75	1.4739	0.9234	Positive....	Cotton seed oil, sold as a substitute for sweet oil.
8833	72.67	1.4739	.....	do.....	Cotton seed oil, misbranded; sale as sweet oil illegal
9126	73.54	1.4744	0.9246	do.....	do.
9214	73.78	1.4745	.....	Negative....	Not a sweet oil; sale as sweet oil illegal.
8907	72.80	1.4739	.....	Positive....	Cotton seed oil; sale as sweet oil illegal.
9233	73.50	1.4744	0.9227	do.....	Cotton seed oil, misbranded. It is labeled "oil," "sweet oil," then in very small letters "cotton seed oil." The label is deceptive; sale illegal.
8829	72.96	1.4739	0.9233	do.....	Cotton seed oil, misbranded; sale as sweet oil illegal
9228	73.70	1.4745	0.9224	do.....	do.
9224	69.43	1.4718	0.9178	Negative....	Sweet oil (olive oil).
8831	71.48	1.4732	.....	Positive....	Cotton seed oil, misbranded; sale as sweet oil illegal
9225	74.00	1.4747	0.9224	do.....	do.
9219	73.00	1.4741	0.9225	do.....	Cotton seed oil, misbranded. It is branded "olive sweet oil"; sale illegal.
9379	73.54	1.4744	0.9244	do.....	do.
8828	73.30	1.4742	0.9245	do.....	Cotton seed oil, misbranded; sale as sweet oil illegal
9217	73.40	1.4743	.....	do.....	do.
9227	72.00	1.4735	0.9226	do.....	do.
8908	72.80	1.4539	.....	do.....	do.
9128	67.83	1.4708	0.9178	Negative....	Sweet oil (olive oil).
8909	71.80	1.4533	.....	Positive....	Cotton seed oil, misbranded; sale as sweet oil illegal
9215	67.50	1.4707	.....	Negative....	Sweet oil (olive oil).
9221	73.50	1.4744	0.9224	Positive....	Cotton seed oil, misbranded; sale as sweet oil illegal

RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9226	Sweet Oil, Vicks Triangle	Richardson, L., Drug Co., Greensboro, N. C.	R. G. Hiatt, Greensboro
9216	Sweet Oil	Scott, Jno. M., & Co.	Lackey Bros., Hamlet
9127	do	do	L. H. Caldwell, Lumberton
8905	do	do	do
9129	do	Smith, Dr. T. C., Asheville, N. C.	Dr. T. C. Smith, Asheville
9218	Sweet Oil, Purl	Suffolk Drug and Extract Co., Suffolk, Va.	W. R. Lysterly, Salisbury
8830	Sweet Oil, New Era	Terry-Taylor Drug Co., Norfolk, Va.	D. Lichtenstein, Tarboro
9220	Sweet Oil, Our Seal	Vaughn-Crutchfield Co., Winston-Salem, N. C.	Bates & Burkhead, Lexington
9222	do	do	R. L. Leonard, Lexington
9223	Sweet Oil	Webb Mfg. Co., Nashville, Tenn.	C. E. Siccloff, High Point
8832	do	Williams, Martin & Gray, Norfolk, Va.	Latham, Owens & Co., Plymouth
9230	Cotton Seed and Sweet Oils		M. L. Milhken, Hamlet

VINEGAR AND VINEGAR SUBSTITUTES.

Vinegar is the product made by the alcoholic and subsequent acetous fermentation of the juice of apples, and contains not less than 4.00 per cent of acetic acid, not less than 1.60 per cent of apple solids, of which not more than 50.00 per cent are reducing sugars, and not less than 0.25 per cent of apple ash.

Wine vinegar is the product made by the alcoholic and subsequent acetous fermentation of the juice of grapes, and contains not less than 4.00 per cent of acetic acid, not less than 1.00 per cent of grape solids, and not less than 0.13 per cent of grape ash.

Malt vinegar is the product made by the alcoholic and subsequent acetous fermentation, without distillation, of an infusion of barley malt or cereals whose starch has been converted by malt, is dextro-rotary, and contains not less than 4.00 per cent of acetic acid, not less than 2.00 per cent of solids, and not less than 0.2 per cent of ash.

Distilled spirit vinegar is the product made by the acetous fermentation of dilute distilled alcohol, and contains not less than 4.00 per cent acetic acid.

Besides vinegar, the product made from apple cider, the standards under the food law recognize five other products that can be sold as vinegar, provided the word vinegar is accompanied by the name of the class to which the product belongs; as malt vinegar, wine vinegar, distilled spirit vinegar; but to comply with the law, a product to be sold as "vinegar" must be a product made from apple cider.

OF SWEET OILS—*Continued.*

Laboratory Number	Reading Refractometer, at 15.5°C.	Refractive Index	Specific Gravity 15.5°C.	Hallphen Test for Cotton Seed Oil	Remarks and Conclusions
9226	72.20	1.4736	0.9212	Positive	Cotton seed oil, misbranded; sale as sweet oil illegal
9216	72.50	1.4738	.....	do	do.
9127	72.83	1.4739	0.9224	do	do
8906	72.30	1.4536		do	do
9129	73.12	1.4742	0.9243	do	do.
9218	74.40	1.4739		do	do.
8830	72.96	1.4739	0.9233	do	Cotton seed oil, misbranded; sale as sweet oil illegal. Label does not bear name and address of manufacturer.
9220	73.20	1.4742	0.9225	do	Cotton seed oil, and so stated in small letters on label; misbranded by labeling "sweet oil" in much larger letters; sale illegal.
9222	73.70	1.4745	0.9225	do	Cotton seed oil, misbranded; sale as sweet oil illegal.
9223	66.70	1.4702	0.9156	Negative	Sweet oil (olive oil).
8832	72.67	1.4739	.....	Positive	Cotton seed oil, misbranded; sale as sweet oil illegal.
9230	72.50	1.4738	0.9221	do	Cotton seed oil and sweet oil; label does not show name and address of manufacturer.

There are many substitutes for vinegar, such as malt vinegar, compound vinegar, spirit vinegar, etc., and must be sold as such and not as vinegar. One of the greatest violations of the Food Law at present is the sale of these substitutes for vinegar. A customer orders or asks a grocery man for vinegar and he is furnished with one of the above substitutes for vinegar without explanation as to its real character.

Under this head 104 samples were examined, 26 of which were either adulterated, misbranded or misrepresented. In many cases manufacturers and jobbers sell retail dealers vinegar without further specifying the kind of vinegar. Then to protect themselves against the national food law, they brand it distilled vinegar, compound vinegar, etc., as the case may be. The dealer receives the goods without specially noticing the label, thinking that he has vinegar, and proceeds to sell it for same. On the other hand, it appears that often when substitutes for vinegar are sold for, invoiced and labeled just what they are, the dealer imposes on his customers by selling them these products for vinegar. To just what extent the dealers are deceived in regard to the products they handle, it is difficult to say, but one thing is true to be sure: much of the so-called vinegar on the market is invoiced and branded just what it actually is, but is sold by the retail dealers for vinegar, which it is not. Whether the retail dealer is actually deceived in the matter or not is difficult to say and makes but little difference to the consumer. The latter gets a poor substitute for vinegar though the dealer gets his money just the same.

RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9061	Vinegar, Distilled, Gold Seal.	Alart & McGuire, New York, N. Y.	Peoples Supply Co., Wilmington.
9065	Vinegar.....	American Fruit Produce Co., Rochester, N. Y.	Wilmington Grocery Co., Wil- mington.
8415	do.....	American Preserve Co., Philadel- phia, Pa.	Geo. S. Powell, Raleigh.....
8650	do.....	C. W. Antrim & Sons, Richmond, Va.	C. E. Jourdan, Durham.....
9078	do.....	Armfield & Co., Fayetteville, N. C.	J. B. Buckingham, Fayetteville
9067	Vinegar, Grape.....	Sol. Baer, Wilmington, N. C.	S. W. Sanders, Wilmington.....
9149	Vinegar, Mt. Vernon.....	Board-Armstrong Co., Alexandria, Va.	J. L. Nix, Salisbury.....
9143	Vinegar, Whitehouse.....	do.....	S. B. McLaughlin, Charlotte....
9063	Vinegar, Mt. Vernon.....	do.....	Baggett Bros., Wilmington.....
8568	Vinegar.....	do.....	Breedlove & McFarland, Oxford
8652	do.....	do.....	T. H. Alford, Durham.....
9071	do.....	Ed. Boushee, Wilmington, N. C.	C. D. Gore, Wilmington.....
9070	do.....	do.....	H. D. Oldenbottle, Wilmington
9064	do.....	do.....	W. F. Benton, Wilmington.....
9137	do.....	Burr Manufacturing Co., Rich- mond, Va.	Hinson & Kirk, Wadesboro.....
8742	Vinegar, Distilled.....	do.....	Clark Smith Co., Belhaven.....
8747	Vinegar.....	W. S. Crosse, Norfolk, Va.	J. D. Gurganus, Williamston....
8419	Vinegar, Malt.....	Crosse & Blackwell, London, E.	H. J. Johnson, Raleigh.....
8738	Vinegar.....	Fray & Sons, Baltimore, Md.	J. O. Everett, Plymouth.....
9077	do.....	D. J. Gregory, Richmond, Va.	W. G. Clark, Fayetteville.....
8724	do.....	do.....	Ruffin High Co., Wilson.....
8730	do.....	Gregory, O. L., Vinegar Co., Paducah, Ky.	L. L. Worsley, Rocky Mount ..
8728	do.....	Hales, Geo. J., & Bro., Rocky Mount, N. C.	Joyner & Robbins, Rocky Mount
8752	Vinegar, Malt.....	Haynor Mfg. Co., Norfolk, Va.	City Grocery Co., Weldon.....
8565	do.....	Heinz, H. J., Pittsburg, Pa.	City Grocery Co., Henderson....
8421	do.....	do.....	Rosenthal & Co., Raleigh.....
8725	Vinegar, Sirup.....	do.....	F. Y. Arrington, Rocky Mount.
9142	Vinegar.....	Henderson, W. I., Charlotte, N. C.	Rhyne Bros., Charlotte.....
9139	Vinegar, Distilled and Apple.	Hicks, R. W., Wilmington, N. C.	M. L. Flowe, Monroe.....
9060	Vinegar.....	do.....	F. W. Mohr, Wilmington.....
9069	do.....	Hirsch Bros. & Co., Louisville, Ky.	J. B. Fales, Wilmington.....
9073	do.....	do.....	King Bros., Wilmington.....
9074	do.....	do.....	J. S. Westbrook, Wilmington....
8569	do.....	Hughes, R. M., & Co., Louisville, Ky.	L. Thomas, Oxford.....
9131	Vinegar, Monogram.....	do.....	R. B. Terry & Co., Hamlet.....

VINEGAR AND VINEGAR SUBSTITUTES.

Laboratory Number	Solid Matter in Solution— Per Cent	Ash— Per Cent	Acidity (Acetic)— Per Cent	Sodium Bicarbonate	Remarks and Conclusions
9061	0.16	-----	4.18	No change	Distilled spirit vinegar, not properly labeled; sale illegal.
9065	2.91	0.35	4.70	Black	Vinegar.
8415	1.79	0.30	4.86	do	do.
8650	1.87	0.30	4.15	do	do.
9078	0.24	-----	4.00	-----	Distilled spirit vinegar, colored; misrepresented; sale illegal.
9067	7.33	0.13	4.00	Black	Grape vinegar.
9149	0.22	-----	4.32	No change	Distilled spirit vinegar, misrepresented by retail dealer; was sold as vinegar; sale illegal.
9143	2.11	0.42	4.65	Dark	Vinegar.
9063	0.34	-----	4.13	No change	Distilled spirit vinegar; colored; misrepresented by retail dealer; sale illegal.
8568	2.20	0.39	4.08	Black	Vinegar.
8652	2.32	0.35	4.22	do	do.
9071	0.18	-----	4.40	No change	Distilled vinegar, colored. Vinegar is made from apple cider; sale illegal.
9070	0.28	-----	4.98	do	Distilled spirit vinegar, misrepresented; sale illegal.
9064	0.24	-----	4.87	do	do.
9137	0.19	-----	4.11	do	Distilled spirit vinegar, colored; misrepresented by retail dealer; sale illegal.
8742	0.28	-----	4.23	do	Distilled spirit vinegar.
8747	2.97	0.49	4.20	Black	Vinegar.
9419	2.25	0.28	5.70	Dark	Malt vinegar.
8738	2.63	0.34	5.97	Black	Vinegar.
9077	2.96	0.31	4.70	do	do.
8724	3.14	0.24	4.75	do	do.
8730	3.20	0.41	4.87	Dark	Vinegar to which water had been added either in the making or since. It also appeared that solid matter had been added.
8728	3.16	0.26	4.51	Black	Vinegar.
8752	0.25	0.03	5.72	No change	Distilled spirit vinegar, misbranded; sale illegal
8565	2.50	0.27	5.15	Black	Malt vinegar.
8421	2.70	0.27	4.52	do	Vinegar.
8725	2.20	0.31	4.95	No change	Vinegar, sirup.
9142	0.24	-----	4.15	do	Distilled spirit vinegar, misrepresented by dealer. Was sold as vinegar; sale illegal.
9139	0.18	-----	3.34	do	Distilled spirit vinegar, adulterated and mis- branded. Contains no appreciable amount of apple vinegar; below standard; sale illegal.
9060	1.88	0.25	3.15	Dark	Vinegar, below standard in acidity; adulterated and misbranded; sale illegal.
9069	0.32	-----	4.27	No change	Distilled spirit vinegar, was sold by dealer for vin- egar, although barrel was labeled spirit vinegar; sale illegal.
9073	2.16	0.31	4.13	Black	Vinegar.
9074	2.45	0.33	4.98	do	do.
8569	2.36	0.28	5.10	do	do.
9131	0.65	-----	4.79	No change	Compound vinegar; vinegar and distilled vinegar, was represented by dealer as vinegar, though not so labeled; sale as vinegar illegal.

RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
9132	Vinegar, Monogram	Hughes, R. M. & Co., Louisville, Ky.	J. W. Pegram, Hamlet.....
9138	Vinegar	do	D. E. Gatewood, Wadesboro ..
9136	do	do	V. F. Tarleton, Wadesboro.....
9154	Vinegar and Distilled Vin- egar.	do	Chrisman & Bros., Greensboro ..
8570	Vinegar, Distilled and Apple.	do.	Allen's Grocery Co., Oxford.....
8571	do	do.	Perry, Wood & Co., Durham. .
8644	Vinegar and Distilled Vin- egar.	do	Johnson & Hewitt, Durham. .
8648	do	do.	M. Hockfield, Durham.....
8649	Vinegar	do	Barbee & Elliot, Durham.....
8722	Vinegar Compound	do	Strickland & Lewis, Wilson. .
8726	Vinegar and Distilled Vin- egar.	do	G. F. Jones, Rocky Mount.....
8727	do	do.	J. W. Davenport, Rocky Mount
8422	Vinegar	do.	W. B. Mann & Co., Raleigh. .
8564	Vinegar and Distilled Vin- egar.	do.	A. A. Bullock, Henderson.....
8755	Vinegar	do.	W. T. Parker, Weldon.....
8756	Vinegar, Monogram	do.	W. G. Kimball, Enfield.....
8414	Vinegar and Distilled Vin- egar.	do.	C. C. Jones, Raleigh.....
8748	Vinegar	do	Cowing & Co., Williamston....
8743	Vinegar, Eagle	Fine, I. S., Corporation, Norfolk, Va.	J. D. Traylor, Edenton.....
9076	Vinegar, Blue Grass Belle	Jones Bros. & Co., Louisville, Ky.	J. H. Wishart, Lumberton.....
8734	Distilled Vinegar and Grape Vinegar.	Knotts, T. G., Suffolk, Va.	Chas. M. Little, Washington....
8729	do	do.	Bobbitt & Co., Rocky Mount....
8723	do	do	W. J. Taylor, Wilson.....
8721	do	do	Barnes & Graves, Wilson.....
8749	Vinegar	Lewis & Co., Scotland Neck, N. C.	W. J. Hodges, Williamston.....
9153	Vinegar, Libby's.	Libby, McNeill & Libby, Chicago, Ill.	Patterson Bros., Greensboro....
9144	Vinegar	Link, H. G., Charlotte, N. C.	W. M. Burkhead, Charlotte.....
9147	do	Miller, D. M., & Son, Salisbury, N. C.	D. M. Miller & Son, Salisbury....
8735	Vinegar, Distilled	Mixon, E. R., & Co., Washington, N. C.	William Swanner, Washington ..
8416	Vinegar	Mott, S. R. & J. C., Bouchville, N. Y.	Rudy & Buffaloe, Raleigh.....
9072	do	Mott, S. R. & J. C., Rochester, N. Y.	C. H. Bornemann, Wilmington ..
8418	do	Norris Bros., Raleigh, N. C.	A. S. Womble, Raleigh.....
8753	do	Oberndorfer & Co., Norfolk, Va.	City Grocery Co., Weldon.....
8754	do	Old Homestead Mfg. Co., Rich- mond, Va.	C. J. Evans, Weldon.....
8572	Vinegar, Sirup, Old Home- stead.	do	Perry-Wood Co., Durham.....
9135	Vinegar	Parsons-Hardison Co., Wadesboro, N. C.	J. H. Tice, Wadesboro ..

AND VINEGAR SUBSTITUTES—*Continued.*

Laboratory Number	Solid Matter in Solution— Per Cent	Ash— Per Cent	Acidity (Acetic)— Per Cent	Sodium Bicarbonate	Remarks and Conclusions
9132	0.79	.....	4.44	No change	Compound vinegar; vinegar and distilled vinegar, was represented by dealer as vinegar, though not so labeled; sale as vinegar illegal.
9138	2.24	0.37	4.09	Black	Vinegar.
9136	0.91	0.14	5.18	Darker	Compound vinegar, vinegar and distilled vinegar, was represented by dealer to be vinegar, though not so labeled; sale as vinegar illegal.
9154	0.51	.....	4.50	do	Compound vinegar, vinegar and distilled vinegar.
8570	0.94	.....	4.95	do	do.
8571	2.23	0.31	4.85	do	do.
8644	0.92	.....	5.13	No change	do.
8648	0.96	.....	4.98	do	do.
8549	1.89	0.25	5.08	Black	Vinegar.
8722	0.41	.....	4.32	Darker	Compound vinegar.
8726	0.69	.....	4.71	do	do.
8727	0.67	.....	4.87	do	do.
8422	1.74	0.21	4.11	Black	Vinegar.
8564	1.15	.....	4.56	Darker	Compound vinegar.
8755	1.95	0.27	4.18	Black	Vinegar to which water had been added.
8756	2.15	0.38	4.59	do	do.
8414	0.75	0.15	4.70	Dark	Compound vinegar, distilled vinegar and vinegar.
8748	1.60	0.25	4.02	Black	Vinegar to which water had been added.
8743	0.37	.....	4.68	No change	Distilled spirit vinegar, misbranded; sale illegal.
9076	2.33	0.32	4.45	Black	Vinegar.
8734	1.54	0.09	5.34	No change	Compound vinegar; grape and distilled vinegar.
8729	2.44	0.05	5.33	do	do.
8723	1.71	0.05	5.33	do	do.
8721	1.77	0.06	5.42	do	do.
8749	2.19	0.30	5.07	Black	Vinegar.
9153	0.13	.....	5.63	No change	Distilled spirit vinegar, misbranded; sale illegal.
9144	0.28	.....	4.82	do	Distilled spirit vinegar, misrepresented; sale as vinegar illegal.
9147	10.96	1.07	6.69	Black	Vinegar.
8735	0.30	0.04	4.77	No change	Distilled spirit vinegar.
8416	2.71	0.71	4.84	Black	Vinegar.
9072	2.77	0.37	4.54	do	do.
8418	2.65	0.35	4.77	do	do.
8753	0.57	0.10	4.37	Darker	Compound vinegar, misbranded; was sold as vinegar; sale illegal.
8754	2.14	0.31	4.37	Black	Vinegar.
8572	0.83	.....	4.62	No change	Sirup vinegar
9135	3.72	0.50	4.68	Black	Vinegar.

RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
8417	Vinegar	Phillips & Penny, Raleigh, N. C.	J. F. Cain & Son, Raleigh
9032	do.	Seeman Bros., New York, N. Y.	E. H. Holmes, Wilmington
9145	do.	Shelby, E. S., Vinegar Co., Richmond, Va.	J. E. Smith & Bro., Concord
9148	Vinegar and Distilled Vinegar.	do.	D. L. Cauble, Salisbury
9140	Distilled Vinegar	do.	S. B. Hart, Monroe
8563	Vinegar	do.	Pierce & Ford, Henderson
8567	Vinegar, Golden Rod	do.	Ellington Grocery Co., Henderson
8645	Vinegar	do.	N. E. Couch, Durham
9150	do.	Simpson-Peacock Co., Salisbury	A. S. West, Salisbury
8746	Vinegar, Sirup	Southern Cider and Vinegar Co., Norfolk, Va.	M. Hathaway, Hertford
8739	Vinegar	Southern Distributing Co., Norfolk, Va.	J. C. Spruill, Plymouth
8643	do.	Thomas-Howard Co., Durham	F. M. Carlton, Durham
8647	do.	do.	T. M. Stephens, Durham
8651	do.	Thompson, Edgar, Durham, N. C.	F. G. Ligon, East Durham
9079	do.	Valentine, F., Norfolk, Va.	City Grocery Co., Weldon
8420	do.	Williams, R. C., & Co., New York, N. Y.	H. J. Johnson, Raleigh
8596	do.	do.	City Grocery Co., Henderson
8720	Vinegar, Robin Hood	do.	Moody-Carroll Co., Wilson
8750	Vinegar	Woodard, E. L., & Co., Norfolk, Va.	J. L. Hassell & Co., Williamston
8744	do.	Woodley, W. J., Elizabeth City, N. C.	H. W. Heath, Elizabeth City
8736	Vinegar and Distilled Vinegar.	do.	Cox, A. J., & Co., Washington
9146	Vinegar	do.	Dove-Bost & Co., Concord
8646	do.	do.	J. D. Edwards, Durham
8731	do.	do.	Hub Grocery Co., Rocky Mount
8737	do.	do.	L. S. Landing, Plymouth
9151	Vinegar and Distilled Vinegar.	do.	R. L. Leonard, Lexington
9155	Vinegar	do.	J. H. Low, Greensboro
9068	do.	do.	H. B. Michaelis, Wilmington
9133	do.	do.	Planters Trading Co., Laurinburg
8751	do.	do.	J. W. Robertson, Scotland Neck
9075	do.	do.	C. G. Stephens & Co., Lumberton
9141	do.	do.	M. Waller, Monroe
9066	Vinegar, Compound	do.	J. E. Washburn, Wilmington
8745	Vinegar	do.	C. V. Williford, Hertford

AND VINEGAR SUBSTITUTES—*Continued.*

Laboratory Number	Solid Matter in Solution— Per Cent	Ash— Per Cent	Acidity (Acetic)— Per Cent	Sodium Bicarbonate	Remarks and Conclusions
8417	2.73	0.33	4.58	Black	Vinegar.
9062	1.59	0.35	4.89	do	do.
9145	0.25		3.46	No change	Distilled spirit vinegar, below standard in acidity; misrepresented by retail dealer; sale as vinegar illegal.
9148	0.72		3.11	do	Vinegar and distilled vinegar.
9140	0.26		3.76	do	Distilled spirit vinegar, below standard in acidity; sale illegal.
8563	2.69	0.36	4.31	Black	Vinegar to which water had been added.
8567	2.50	0.40	4.92	do	do.
8645	3.15	0.67	4.51	do	do.
9150	0.50		3.56	Darker	Compound vinegar, below standard in acidity; misrepresented; sale as vinegar illegal.
8746	0.57	0.09	4.65	No change	Sirup vinegar.
8739	2.03	0.38	4.17	Black	Vinegar.
8643	1.92	0.41	4.11	do	do.
8647	2.39	0.37	4.00	do	do.
8651	1.52	0.20	4.13	do	Vinegar, to which a little water had been added.
9079	2.55	0.49	3.93	do	Vinegar, slightly below standard in acidity.
8420	1.88	0.34	4.04	do	Vinegar.
8566	2.56	0.37	4.55	do	do.
8720	2.00	0.33	4.00	do	Vinegar to which water had been added.
8750	1.81	0.35	4.17	do	Vinegar.
8744	2.85	0.35	5.15	do	do.
8736	1.99	0.33	4.29	Darker	Compound vinegar and distilled vinegar; not properly labeled; does not show name and address of manufacturer.
9146	1.83	0.33	4.08	Black	Vinegar.
8646	2.69	0.33	4.36	do	Vinegar, not properly labeled.
8731	2.07	0.24	5.21	do	Vinegar, to which water had been added; does not show name and address of manufacturer.
8737	2.17	0.38	4.32	do	Vinegar, does not bear name and address of manufacturer or jobber.
9151	0.35		3.87	Darker	Vinegar and distilled vinegar, amount of vinegar too small to be so labeled; below standard; sale illegal.
9155	3.32	0.33	2.46	Black	Vinegar, below standard in acidity; does not show name and address of manufacturer or jobber; sale illegal.
9068	2.95	0.42	4.31	do	Vinegar.
9133	2.61	0.39	4.38	do	Vinegar, did not show name of manufacturer or jobber.
8751	3.02	0.47	4.34	do	do.
9075	3.07	0.26	3.01	do	Vinegar, below standard in acidity; sale illegal.
9141	0.34		4.74	No change	Distilled spirit vinegar, was sold as vinegar; misrepresented; sale illegal.
9066	0.54		4.80	Darker	Compound vinegar, does not show name and address of manufacturer or jobber.
8745	2.08	0.39	4.12	Black	Vinegar, does not show name and address of manufacturer or jobber.



LEAF TOBACCO SALES FOR OCTOBER, 1911.

Pounds sold for producers, first hand.....	17,657,618
Pounds sold for dealers	1,365,247
Pounds resold for warehouses.....	843,115
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Total	19,865,980

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THE BULLETIN
OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
RALEIGH

Volume 32--No. 11. SUPPLEMENT NOVEMBER 1911. Whole No. 161

STOCK FEEDS

SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,
February 7, 1901, under act of June 6, 1900.

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* Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, October 16, 1911.

SIR:—I submit herewith manuscript covering the inspection and analysis of concentrated stock feeds during the past year. I recommend its publication as supplement to the November Bulletin.

Very respectfully,

B. W. KILGORE,

State Chemist.

TO HON. WILLIAM A. GRAHAM,

Commissioner of Agriculture.

COMMERCIAL FEEDS AND CONDIMENTAL FEEDS, STOCK AND POULTRY TONICS AND CONDITIONERS.

By G. M. MACNIDER, FEED CHEMIST AND MICROSCOPIST,

ASSISTED BY

HUBERT HILL, ASSISTANT CHEMIST.

Since the publication of the last Report on Commercial Feeds 544 samples of feeds and 18 samples of condimental feeds have been analyzed, making a total of 562 samples.

The number of samples of each class of feed are as follows:

Wheat Bran and Mixed Brans.....	62
Middlings or Shorts	77
Bran and Shorts	14
Shipstuff	59
Rye Feeds	3
Corn and Oat Feeds	6
Rice Feeds	10
Molasses Feeds	22
Alfalfa Feeds	27
Beet Pulp	6
Chop Feeds and Meals	14
Cotton-seed Feeds	30
Peanut Feeds	2
Linseed Meal	1
Gluten Feeds	3
Cracked Corn	40
Distiller's Dried Grains	4
Special Mixed Feeds	55
Poultry Feeds	37
Miscellaneous Mixed Feeds	43
Microscopic Examinations of Feeds not Analyzed	29
Condimental Feeds	18
Total	562

SUMMARY OF THE REQUIREMENTS OF THE STATE FEED LAW.

A copy of the State Feed Law, together with the rulings and standards adopted by the Board of Agriculture, will be mailed upon request. The following brief summary gives the chief points of the law, with which every manufacturer must comply before offering feeds for sale in this State:

All feeds offered for sale in this State shall be in standard weight packages of 25, 50, 75, 100, 125, 150, 175 and 200 pounds.

The packages or bags shall bear a plain statement of the name, brand or trade-mark under which the feed is sold; the name and address of the manufacturer, jobber or importer; the names of each and all the

ingredients of which the feed is composed, and a statement of the minimum percentage of protein and fat and the maximum percentage of crude fiber.

The term "Commercial Feed" includes all feeds used for live stock and poultry, except hays, straws, corn stover and whole grains.

Every manufacturer selling goods in this State must register each brand with the Commissioner of Agriculture and file a statement of the requirements as stated above.

The manufacturer must pay to the Commissioner of Agriculture an inspection tax of twenty cents per ton for every ton of feed offered for sale in the State. Each package must have attached to it a tax stamp, furnished by the Commissioner, showing that these charges have been paid.

Section 7 states the conditions under which feeds shall be withdrawn from sale and defines adulterants.

Section 9 gives the Board of Agriculture power to adopt such standards and regulations as may be necessary for the enforcement of the law.

The following standard guarantees have been adopted:

STANDARDS ADOPTED.

	Percentages		
	Protein	Fat	Crude Fiber
For pure wheat bran	14.50	4.00	11.00
For pure wheat middlings	15.00	4.00	8.00
For wheat bran and middlings mixed	14.50	4.00	8.00
For rice bran	12.50	10.00	10.00
For rice polish	11.50	7.00	6.30
For mixed corn and oat feed	10.00	4.00	9.00
For linseed meal	30.00	3.00	10.00
For molasses feeds or sugar feeds	10.00	3.25	12.00

In all other feeds or mixtures of feeds the manufacturer is permitted to make his own minimum guarantee of protein and fat and his maximum guarantee of fiber: *Provided*, that no feeds or mixtures of feeds will be accepted for registration or allowed to be offered for sale in this State that contain less than ten per cent crude protein, or until standards are fixed by this Department for the feed offered for registration, and he is then expected to live up to his guarantee.

Definitions.—The subject of definitions for Commercial Feeds is now under consideration by the Association of Feed Control officials and will be published as soon as a satisfactory set of definitions are agreed upon.

The two following definitions are of special importance, and are strictly enforced by this Department:

Shipstuff: The term Shipstuff shall be applied only to mixtures of wheat products. If corn or other products are mixed with wheat prod-

ucts and sold under the name of shipstuff they will be considered to be adulterated.

Cotton-seed Feeds: All mixtures of cotton-seed meal and hulls containing less than 38.62 per cent of protein shall be branded Cotton-seed Feed or sold under a trade name which does not contain the word "Meal" or any word that might be misleading to the purchaser.

Other rulings relating to shipments in bulk, branding, etc., have been adopted and are published in another form which will be mailed upon request. The above information is given so that a manufacturer may register and put his feeds on sale in the State without making a study of the law.

It is the duty of the Department of Agriculture to regularly inspect the feeds offered for sale in the State and to see that all feeds bear the tax stamp and are properly labeled. The Department is required to collect and analyze at least one sample of every brand of feed found on sale in the State during the year and to publish the results for the benefit of those interested in this class of goods.

The Department will be glad, at any time, to furnish information regarding the character and value of any class of feed.

RESULTS OF THE ENFORCEMENT OF THE FEED LAW.

The first feed law in North Carolina went into effect in July, 1903. At that time it was found that the markets of the State were flooded with low-grade and adulterated feeds, with no branding on the bag to indicate that they were made of anything but high-grade materials. Such materials as rice chaff, ground corncobs, peanut hulls, oat hulls, etc., with very little feeding value and now classed as adulterants, were used extensively in the composition of feeds.

Since the first law went into effect the Department has made frequent inspections each year in all parts of the State, and wherever adulterated or misbranded feeds have been found they have been withdrawn from sale. The result of this work has been the steady decrease, from year to year, in the number of adulterated feeds on the market, and the steady increase in the quality of the feeds of all classes.

With the publication of this, the ninth report on feeds, it will be noticed that there are comparatively few cases of adulteration reported. Following each table of analyses will be found a statement of the number of samples which fail to come up to the manufacturer's guarantee. While this number is comparatively large in some classes of feeds it will be noticed that in the majority of cases the difference between the guarantee and the analysis is comparatively small. This trouble is due largely to the manufacturers not adhering close enough to the chemical analyses of their products in making up the guarantees for them.

The present law requires the statement on the bag or tag of the ingredients of which the feed is composed. Several seizures have been made during the year on account of this requirement not being complied with. These have been principally feeds offered for sale under the name of "Mill Feed," consisting of a mixture of wheat products and a small amount of corn bran and meal. In all such cases the feeds have been

withdrawn from sale until the manufacturer furnished the dealer with properly printed tags showing the ingredients of which the feed was composed.

Adulteration of Shipstuff.—The definition for shipstuff used by this Department, and the one which is recognized generally by the trade, requires that it shall be composed of wheat products only. By referring to the tabulated analyses of shipstuff it will be seen that fourteen samples are reported in which the shipstuff is adulterated with corn bran. Wherever such lots of shipstuff have been found they have been withdrawn from sale until the manufacturers rebranded them as "Mixed Feed" and stated plainly on the tag that the feed was composed of wheat and corn products.

The most serious case of adulteration was with one shipment of Rice Bran, shipped into the State from New Orleans. This lot of rice bran was not offered for sale under a guaranteed analysis. The chemical analysis showed it to be considerably below the standard for this product and to be adulterated in that it contained 33.66 per cent of rice hulls. On this account this lot of rice bran was not allowed to be sold in the State and the manufacturers were required to ship it out of the State.

As the result of the strict enforcement of the Feed Law the feeds on sale in the State are, as a whole, a very clean grade of products with comparatively little adulteration.

REGISTRATION.

In compliance with Section 3 of the Feed Law 260 manufacturers have registered their feeds with this Department. The total number of brands registered is 690, distributed among the following classes of feeds:

Wheat Bran and Mixed Brans.....	92
Middlings or Shorts	102
Bran and Shorts	35
Shipstuff	25
Rye Feeds	3
Corn and Oat Feeds	11
Rice Feeds	22
Molasses Feeds	34
Alfalfa Feeds	36
Beet Pulp	1
Chop Feeds and Meals	16
Cotton-seed Feeds	26
Peanut Feeds	1
Gluten Feeds	6
Cracked Corn	14
Special Mixed Feeds	55
Poultry Feeds	127
Miscellaneous Mixed Feeds	61
Wheat Feeds	23
Total	690

PURCHASING FEEDS.

The selection of the proper feeds for different animals is a much more important matter than it is usually considered by the average purchaser and should receive careful attention. The high prices of feeds have created a market for a variety of low grade feeds that otherwise would not have found a market. Such feeds frequently sell for a comparatively low price, but it is seldom economical to buy them. The number of different feeds now offered for sale in the State affords the purchaser a wide range of products from which to select. The purchaser should first ascertain if the feeds he is considering buying are unadulterated and come up to the guarantees which are claimed for them. When this is done the selection of a feed should be governed by the relative cost of the different available feeds and by their palatability and nutritive values.

The average composition of the various products used for feeds will be found under the description of the different products. The analyses of the different brands will be found in the tables compared with the guarantees which the manufacturers make for them. The chemical analysis shows the total amounts of the various nutrients; not all of the total amounts shown by such analyses are digestible and the purchaser should inform himself as to the relative digestibility of the different feeds. While it is not within the range of this bulletin to give a discussion on the feeding of animals the following table of digestion co-efficients is given so that the purchaser may get a general idea of the digestibility of the feeds usually found on the markets.

By co-efficient of digestion is meant the percentage of a given nutrient that is digestible. This is determined by actual feeding experiments with animals. The co-efficients in the following table were obtained by digestion experiments with ruminants.

DIGESTION CO-EFFICIENTS FOR COMMERCIAL FEEDS.*

	Protein %	Fat %	Fiber %	Nitrogen- free Extract %
Linseed meal (oil meal).....	89	89	57	78
Cotton-seed meal.....	84	94	35	78
Gluten feed.....	85	83	76	89
Dried distillers' grains.....	73	95	95	81
Corn meal.....	66	91	-----	92
Bomby feed.....	65	92	67	89
Oats, whole.....	74	89	31	77
Wheat bran.....	77	63	39	71
Wheat middlings.....	77	88	30	78
Rye feed.....	80	90	-----	88
Corn and oat feeds, low grade.....	70	74	58	59
Molasses beet pulp.....	64	-----	84	91
Molasses feed.....	63	88	52	80

*Lindsey, Mass. Expt. 18th Rept.

Every feed dealer, to protect himself and his trade, should insist on feeds being shipped him in strict compliance with the law. If he will do this and not buy from those manufacturers who do not comply with the law, he will save considerable trouble and inconvenience by having his feeds seized and confiscated by feed inspectors.

THE CHEMISTRY OF FEEDS.

In the chemical analysis of feeds the following determinations are made: protein, fat, fiber, nitrogen-free extract, moisture and ash. Without going into a detailed description of the chemical properties of these classes of substances, the following general discussion will be found valuable in interpreting the analysis of commercial feeds:

PROTEIN.

The term protein or crude protein as used in feed analysis includes all the nitrogenous compounds contained in the feed. These compounds are divided, chemically, into two classes—the true proteins and the amido compounds. Familiar examples of the true proteins are the white of egg, lean meat and the gluten of flour. In seeds and cereal products the amido compounds are present in very small amount, and hence all the nitrogen is regarded as present in the form of protein. The protein compounds contain, approximately, 16 per cent of nitrogen, so to determine the amount of protein in a feed the total amount of nitrogen is determined, and this, multiplied by the factor 6.25, gives the amount of protein.

The protein compounds are of very great importance in feeds, for it is from them that the animal derives the nitrogenous materials from which its muscular tissues are built.

FATS.

Fats, or more properly termed ether extract, include all the substances soluble in dry ether. These substances include the pure fats, such as cotton-seed oil, linseed oil, etc., and the waxes, resins, chlorophyl, etc. In most feeds the waxes and resins are present in such small amount that the entire ether extract may be regarded as fat. In a few feeds, such as alfalfa products, the ether extracts the chlorophyl or green coloring matter of the plants. This amounts to only a small per cent.

CRUDE FIBER.

The term crude fiber includes the woody parts or the structural materials of plants. It is composed largely of cellulose and is the most indigestible part of the feed. As a rule, a feed with a high percentage of fiber is considered to be a low-grade feed.

MOISTURE.

Water is present to some extent in all classes of feed. Hays and commercial feeds usually contain from 6 to 15 per cent of water.

ASH.

Ash is the inorganic or mineral matter of plants. It is composed principally of soda, potash, lime and magnesia, combined in the form of phosphates, sulphates, chlorides and carbonates. The constituents of the ash furnish the material for the bony structure of animals and is used only to a small extent in the tissues and organs.

NITROGEN-FREE EXTRACT.

The term nitrogen-free extract includes the non-nitrogenous constituents of feeds. The principal classes of substances included in this term are the sugars, starch, organic acids, pentosans, etc. In the ordinary feed analysis the nitrogen-free extract is determined by difference; the sum of the percentages of protein, fats, fiber, moisture and ash is subtracted from 100, and the remainder considered as nitrogen-free extract.

CARBOHYDRATES.

The term carbohydrates includes the nitrogen-free extract and the crude fiber. In publishing the analyses the nitrogen-free extract and the crude fiber are reported separately. To get the per cent of carbohydrates in a feed it is only necessary to add the percentages of these two constituents.

The percentage of carbohydrates as stated in the manufacturer's guarantee should be, as above stated, the sum of the per cent of nitrogen-free extract and the per cent of crude fiber.

The following classification will give a clearer understanding of the facts presented above:

Protein ($N \times 6.25$)	{ True proteins. Amido compounds.
Fats (Ether Extract)	{ True fats. Waxes, resins, organic acids, chlorophyl, etc.
Carbohydrates	{ Nitrogen-free extract. { Sugars, Crude fiber. { Starch, Pentosans, etc.

MICROSCOPIC ANALYSIS OF FEEDS.

In addition to the regular chemical analysis, all the feed samples are examined microscopically. This is the final test of their purity.

The chemical analysis shows the percentage amounts of the nutritive constituents of the feed, but it gives no idea of the source from which they are derived, and as the protein and fat are more digestible and hence more valuable in some classes of feeds than in others, it is very important to know just what substances go to make up the feed. The microscopic examination is the only way this can be done with any degree of accuracy.

The chief use of the microscope in feed analysis is in the detection of adulterants and in the detection of the use of spoiled or low-grade seeds. Many feeds are now put on the market in finely ground condition, and

as this destroys the characteristic appearance of the ingredients, it is very easy to adulterate them with finely ground rice chaff, corncobs or peanut hulls. All of these substances have characteristic elements which are readily distinguished under the microscope.

For example, if a mixed feed contains 15 per cent of fiber it would not be considered low grade, provided it is made from good materials; but if the microscopic examination shows that part of this fiber is furnished by rice chaff or corncobs it would be considered a very low-grade feed.

DESCRIPTION AND COMPOSITION OF THE BY-PRODUCTS USED FOR FEED.

The materials used for commercial feeds are usually the by-products of other industries, such as the by-products from flour mills, oil mills, etc. The composition of these materials varies somewhat with the season in which they are grown, the method of milling, etc.; but within reasonable limits the standard grades of these by-products have a very similar composition. The following general descriptions of these products, with the average analyses, compiled from a large number of analyses*, will show what the compositions of each one of these products should be.

WHEAT PRODUCTS.

Bran.—This consists of the outer portion or covering of the wheat grain. It contains the greater portion of the fibrous material of the grain, but is also rich in protein and fat. Average analyses (104 samples): Protein 15.38 per cent; fat 4.63 per cent; fiber 8.30 per cent; nitrogen-free extract 55.08 per cent; water 9.87 per cent; ash 6.74 per cent.

Winter Wheat Bran.—Analysis: Protein 15.87 per cent; fat 4.72 per cent; fiber 8.45 per cent; nitrogen-free extract 55.60 per cent; water 8.43 per cent; ash 6.93 per cent.

Spring Wheat Bran.—Analysis: Protein 14.62 per cent; fat 5.43 per cent; fiber 11.15 per cent; nitrogen-free extract 54.26 per cent; water 8.51 per cent; ash 6.03 per cent.

Middlings or Shorts.—These terms are used, generally, interchangeably in the trade and are used to describe the various products intermediate between bran and flour, some being composed largely of starchy matter, while others contain more of the fibrous tissues of the grain.

Average analysis (99 samples) of goods sold under the name middlings or shorts: Protein 16.84 per cent; fat 5.07 per cent; fiber 5.66 per cent; nitrogen-free extract 58.44 per cent; water 9.47 per cent; ash 4.52 per cent.

In addition to the products sold under the general terms of middlings, shorts or standard middlings, the following grades of middlings are made, depending on the process of milling and the parts of the grain of which they are composed.

*The analyses used in these descriptions marked (†) are taken from Bulletin No. 11, Office of Experiment Stations, U. S. Department of Agriculture. Those not so marked are compiled from analyses made in this laboratory.

Flour Middlings.—Average analysis: Protein 17.54 per cent; fat 6.14 per cent; fiber 4.10 per cent; nitrogen-free extract 59.30 per cent; water 8.82 per cent; ash 4.10 per cent.

Red Dog Middlings.—Average analysis (13 samples): Protein 17.15 per cent; fat 5.41 per cent; fiber 2.34 per cent; nitrogen-free extract 61.82 per cent; water 9.68 per cent; ash 3.60 per cent.

Shipstuff.—The term shipstuff should be applied only to mixtures of wheat products. It is generally applied to mixtures of bran and middlings and reground bran. It is frequently misused and applied to mixtures of wheat products and corn chops or corn bran, and sometimes to a mixture of wheat, corn and oat products. Such products should be branded Feed or Mixed Feed, and not Shipstuff.

The following analysis is the average of forty-three samples of pure wheat shipstuff: Protein 15.98 per cent; fat 4.87 per cent; fiber 5.67 per cent; nitrogen-free extract 60.03 per cent; water 8.98 per cent; ash 4.47 per cent.

RYE PRODUCTS.

The by-products from the milling of rye are very similar to those from wheat.

Bran.—Average analysis: Protein 14.70 per cent; fat 2.80 per cent; fiber 3.50 per cent; nitrogen-free extract 63.80 per cent; water 11.60 per cent; ash 3.60 per cent.†

Middlings.—Average analysis (7 samples): Protein 16.07 per cent; fat 3.79 per cent; fiber 4.41 per cent; nitrogen-free extract 60.95 per cent; water 10.50 per cent; ash 4.28 per cent.

CORN PRODUCTS.

Bran.—This is the outer coating of the corn grain. It has a low feeding value and is used to some extent as an adulterant for wheat products. Its chief use is in mixed feeds and corn chops. Average analysis (2 samples): Protein 7.00 per cent; fat 2.82 per cent; fiber 11.89 per cent; nitrogen-free extract 65.44 per cent; water 11.08 per cent; ash 1.77 per cent.

Corn Chops.—This product is quite variable in the ingredients of which it is composed, sometimes being composed of the entire grain and ground rather coarse, while in other cases it is composed of parts of the grain with the addition of reground bran, and cob meal. The following analysis is the average of seven samples of corn products: Protein 8.78 per cent; fat 5.04 per cent; fiber 5.22 per cent; nitrogen-free extract 71.50 per cent; water 7.68 per cent; ash 1.78 per cent. Other names used for this class of products are Hominy Feed and Hominy Chops.

Corn and Cob Meal.—Corn, together with the cob which bears it, are frequently ground together to form what is known as corn and cob meal. In such cases the cobs are not considered an adulterant, provided the amount of cob does not exceed that which would normally be present with the grain, *i. e.*, 14 pounds of cobs to 56 pounds of grain. Average analysis: Protein 8.50 per cent; fat 3.50 per cent; fiber 6.60 per cent; nitrogen-free extract 64.80 per cent; water 15.10 per cent; ash 1.50 per cent.†

Cracked Corn.—This is the whole grain coarsely crushed. On account of the coarseness this product is not very liable to adulteration, the only source of trouble being that it is sometimes made from low-grade or spoiled corn. Average analysis (44 samples): Protein 8.85 per cent; fat 3.98 per cent; fiber 1.93 per cent; nitrogen-free extract 73.45 per cent; water 9.82 per cent; ash 1.97 per cent.

Corn cobs.—(See adulterants.)

Gluten Feed.—This is a by-product from the manufacture of starch and sugar from corn. The following brief description of the manufacture of gluten feed is taken from data very kindly furnished the author by prominent manufacturers.

The first step in the process is for about two days to steep the corn in water at about 110° F. to which has been added a small amount of sulphur dioxide. The grain absorbs the water and there results a swelling which effects a loosening and softening of the various parts of the kernel. The presence of sulphur dioxide prevents decomposition and thus aids in the separation of the whole germ, which would be broken up otherwise in the subsequent process. The steepwater, containing the solubles of the corn, is drawn off and subsequently evaporated, partly neutralized, and incorporated with the gluten feed. The steeped corn is then subjected to a process of grinding and separation, in which advantage is taken of the difference in specific gravity of the component parts, and a separation into germs, bran and endosperm is effected. The germs are dried and from them is produced oil and oil cake. The bran is separated and finally mixed with the gluten and corn solubles (steepwater) to form gluten feed. The endosperm is mixed with water and by a process depending upon the difference in specific gravity of the component parts is separated into starch and gluten. The liquor containing the gluten from this separation is mixed with the bran and filter pressed. The resulting cake is broken up and partially dried. The evaporated and neutralized corn solubles (steepwater) is then added and the mixture dried a second time. After grinding, this mixture constitutes the Gluten Feed of commerce.

During the process of evaporating the steepwater practically all of the sulphur dioxide is driven off so that this does not affect the final product.

Gluten feeds are usually slightly acid. Investigations have shown that this acidity is caused by the addition of the steepwater to the product. The acidity of the steepwater is caused by the presence of certain organic compounds and not to mineral acids and it therefore does not detract from the value of the feed.

Average analysis (4 samples): Protein 26.06 per cent; fat 3.04 per cent; fiber 7.33 per cent; nitrogen-free extract 53.16 per cent; water 6.89 per cent; ash 3.52 per cent.

OAT PRODUCTS.

Whole oats are used to a large extent as a cattle feed. In addition to this, the by-products from the milling of oats in the manufacture of rolled oats and other breakfast foods form an important source of concentrates for feeding.

The following descriptions of the by-products from the milling of oats are taken partly from the descriptions furnished the author by a prominent manufacturer. The analyses were made on samples sent by the manufacturers.

Whole Oats.—Analysis: Protein 11.63 per cent; fat 5.15 per cent; fiber 9.91 per cent; nitrogen-free extract 61.25 per cent; water 8.72 per cent; ash 3.34 per cent.

Oat hulls consist of the outer covering of the oat grain. Analysis: Protein 2.63 per cent; fat 1.08 per cent; fiber 31.49 per cent; nitrogen-free extract 53.83 per cent; water 5.64 per cent; ash 5.33 per cent.

Oat middlings consist of the finer particles of the oat groat that are broken off or sifted out in the process of manufacturing rolled oats. Analysis: Protein 16.44 per cent; fat 8.93 per cent; fiber 1.64 per cent; nitrogen-free extract 64.39 per cent; water 7.60 per cent; ash 3.00 per cent.

Nubbins or heads consist of the portion that comes off in the clipping of the oat. They include the small ends of the groat and also a small portion of the end of the hull. Analysis: Protein 16.88 per cent; fat 6.82 per cent; fiber 4.58 per cent; nitrogen-free extract 61.92 per cent; water 6.42 per cent; ash 3.38 per cent.

Dust is the silken ends or hairs that grow at the end of the groat and are taken off in the course of manufacture. Analysis: Protein 14.00 per cent; fat 6.23 per cent; fiber 16.52 per cent; nitrogen-free extract 50.94 per cent; water 6.30 per cent; ash 6.01 per cent.

From these analyses it will be seen that the hulls have very little value as a feed, while the other products are comparatively rich in the nutritive elements, being high in protein and fat and low in fiber.

These by-products are put on the market in the form of oat feeds, which are mixtures of the several by-products in varying proportions according to the quality of the feed that the manufacturer wishes to make, and they are also used to a considerable extent in mixed feeds, usually sold under a trade name, where they are mixed with alfalfa meal, cracked corn, corn meal, etc.

RICE PRODUCTS.

The by-products from the milling of rice consist of hulls, bran and polish.

Rice Hulls.—Rice hulls are the outer coating of the rice grain. They are composed principally of fibrous material, with a large amount of mineral matter, and are worthless as a feed. The hulls are found to some extent in rice meal and bran, and when present in any considerable amount are considered as an adulterant. For analyses, see adulterants.

Rice Bran.—Rice bran is the thin coating of the grain lying next to the hull.

Average analysis: Protein 12.10 per cent; fat 8.80 per cent; fiber 9.50 per cent; nitrogen-free extract 49.90 per cent; water 9.70 per cent; ash 10.00 per cent.†

Rice Polish.—After the hulls and bran have been removed the rice grains are polished before being put on the market. This process re-

moves the thing coating lying next to the rice grain. It is sold for feed under the name of rice polish.

Average analysis: Protein 11.70 per cent; fat 7.30 per cent; fiber 6.30 per cent; nitrogen-free extract 58.00 per cent; water 10.00 per cent; ash 6.70 per cent.†

Rice Meal.—Rice meal usually consists of a mixture of rice bran and polish, frequently with the addition of varying amounts of hulls.

Average analysis (11 samples): Protein 11.54 per cent; fat 11.49 per cent; fiber 9.96 per cent; nitrogen-free extract 47.77 per cent; water 9.42 per cent; ash 9.82 per cent.

DRIED BEET PULP.

Dried Beet Pulp is the by-product from the manufacture of sugar from sugar beets. After the sugar has been extracted from the ground beets the pulp remaining is dried and put on the market as a feed.

Average analysis (6 samples): Protein 9.18 per cent; fat 0.96 per cent; fiber 17.71 per cent; nitrogen-free extract 60.24 per cent; water 8.29 per cent; ash 3.62 per cent.

MOLASSES FEEDS.

Molasses feeds consist principally of mill by-products mixed with molasses. These feeds vary a great deal in the ingredients of which they are composed, many of them being composed of nutritious ingredients and of good quality, while others contain only low-grade materials the identity of which is covered up by molasses. The ingredients found in the feeds examined are as follows: Mill screenings (frequently containing considerable amount of weed seed), wheat middlings, malt sprouts, corn meal, oat hulls, cotton-seed meal, dried brewers' grains, barley, barley hulls, cracked corn, dried distillers' grains, rice hulls, and a few have a small amount of salt added to them.

Molasses is a carbohydrate, and when properly mixed with materials which contain protein and fat makes a very satisfactory feed. The only danger in buying this class of goods is that some manufacturers use the molasses to cover up worthless adulterants in the feeds.

Mill screenings have been found to compose a large part of some of these feeds. This introduces into the feed a large quantity of weed seeds. Experiments at several stations have shown that in many cases weed seeds when fed to animals are not affected by the digestive process, and hence a large amount of viable weed seeds are left in the manure. When feeds contain considerable amounts of weed seeds the purchaser is not only paying for worthless materials, but is introducing weeds on his land. In most of the brands analyzed this year the screenings containing the weed seeds have been partially ground. This does away with the danger of introducing weeds on the land, but the use of large amounts of such screenings is a questionable practice and does not produce a high grade feed. Oat hulls, barley hulls and rice hulls, all of which are practically worthless as feeds, have been found in considerable quantities in some of these feeds.

The feeds sold as "Dairy Feeds" are usually from three to five per cent higher in protein than those sold as "Feeds" and "Horse and Mule Feeds." They contain some concentrated material such as cotton-seed meal or oil meal which increases the per cent of protein.

Several brands of these feeds contain a small amount of salt, ranging from one-half to one per cent. This is added to make the feed more appetizing to the animal and is not objectionable when only a small amount is added and the fact plainly stated on the label.

ALFALFA FEEDS.

The rapid growth of the industry of grinding alfalfa hay into meal has recently put on the market a larger number of mixed feeds in which alfalfa is the principal ingredient. Various materials are mixed with the meal to increase the percentage of fat and make them more nearly balanced feeds. The materials which have been found in the brands on the markets are as follows: Cracked corn, oats, oat products, cotton-seed meal, linseed meal, corn meal, dried brewers' grains, wheat bran and middlings. As will be seen from the analysis, these feeds are composed of nutritious ingredients, and in only a few cases have low-grade materials been introduced into them.

Several brands of these feeds contain a small amount of salt, ranging from a trace to a little over one-half of one per cent.

COTTON-SEED FEEDS.

A recent ruling of the Board of Agriculture requires that all mixtures of cotton-seed meal and hulls which do not come up to the standard for cotton-seed meal, that is, 6.18 per cent nitrogen or 38.62 per cent protein, shall be branded Cotton-seed Feeds or some trade name which does not contain the word "Meal," or any word that would mislead the purchaser. Such mixtures must be sold under a feed guarantee in place of a nitrogen guarantee.

Quite a number of cotton-seed feeds are now on the market, varying very widely in the amount of protein which they guarantee. These mixtures appear to be filling a demand for a medium grade concentrate, higher in protein than the average mill product and lower in protein than cotton-seed meal.

LINSEED MEAL.

Linseed meal or oil meal is the residue from the extraction of oil from flaxseed. The oil is extracted by two processes, known as the old process and the new process. In the old process the oil is extracted by pressure and in the new process a solvent is used. On account of the extraction being more complete when a solvent is used, the old process meal is richer in fat, while the new process meal is slightly higher in protein.

Old Process Meal—Average analysis (2 samples): Protein, 33.87 per cent; fat 6.08 per cent; fiber 7.29 per cent; nitrogen-free extract 37.89 per cent; water 9.60 per cent; ash 5.27 per cent.

New Process Meal.—Protein 32.20 per cent; fat 3.00 per cent; fiber, 9.50 per cent; nitrogen-free extract 38.40 per cent; water 10.10 per cent; ash 5.80 per cent.†

PEANUT MEAL.

Peanut meal is the ground cake resulting from the extraction of oil from peanuts. This makes a very rich feed. Frequently considerable quantities of peanut hulls are ground with cake. This lowers the value of the meal considerably, as the hulls are practically worthless as a feed.

Average analysis (3 samples): Protein 29.50 per cent; fat 11.38 per cent; fiber 22.73 per cent; nitrogen-free extract 26.93 per cent; water 5.78 per cent; ash 3.68 per cent.

BREWERY AND DISTILLERY BY-PRODUCTS.

Dried Brewers' Grains.—Dried brewers' grains are dried barley grains after they have undergone the process of malting, by which the soluble dextrin and sugar are extracted. Average analysis: Protein 19.90 per cent; fat 5.60 per cent; fiber 11.00 per cent; nitrogen-free extract 51.70 per cent; water 8.20 per cent; ash 3.60 per cent.†

Malt Sprouts.—The small radicles which germinate from the barley in the process of malting are known as malt sprouts. Average analysis: Protein 23.20 per cent; fat 1.70 per cent; fiber 10.70 per cent; nitrogen-free extract 48.50 per cent; water 10.20 per cent; ash 5.70 per cent.†

Dried Distillers' Grains.—Distillers' grains are a by-product from the manufacture of whiskey and alcohol.

In the feeds on sale in the State this year the above three products have been found only as ingredients in mixed feeds.

SPECIAL MIXED FEEDS.

In this class are grouped mixtures of two or more products which are sold under a trade name. These usually consist of wheat and corn products, in a few instances with the addition of cotton-seed meal or linseed meal.

The present feed law requires the statement on the tag of the ingredients of which a feed is composed, and with this class of feeds the purchaser should be careful to note that this statement is made on all tags.

POULTRY FEEDS.

A number of brands of poultry and chick feeds were found on the markets. The ingredients of which these feeds are usually composed are cracked corn, whole oats, barley, kaffir corn, peas, wheat, buckwheat, millet, sunflower seed, and in some brands ground limestone.

The chick feeds are usually composed of the same ingredients which have been partially ground.

One brand of meat meal and one brand of blood meal were found on the markets. These are very concentrated feeds, being high in protein and low in fiber.

MISCELLANEOUS MIXED FEEDS.

In this class are grouped feeds which are sold under the name Mixed Feed, Mill Feed and Feed. These are usually mixtures of wheat products, wheat and corn products, and cotton-seed meal.

As with other classes of mixed feeds, the manufacturers are required to state on the tag the ingredients which compose them, and the purchaser should pay special attention to see that this is done.

SALT IN FEEDS.

It has been found that some manufacturers of mixed feeds now add salt, in small quantity, to the feeds. The molasses feeds and the alfalfa mixed feeds are usually the ones in which salt is found. A number of samples of feeds of these two classes were examined and salt was found in several of them, the amount varying from a few tenths of one per cent to slightly over one per cent. The presence of a very small amount of salt in a mixed feed is not objectionable, but in all cases where it is added the fact should be plainly stated on the tag.

ADULTERANTS.

The following materials when mixed with feeds without sufficient labeling to indicate their presence are considered adulterants: corn bran, rice hulls, ground corncobs, peanut hulls, peanut middlings, oat hulls, mill sweepings, screenings, cotton-seed hulls, and similar products.

ANALYSES OF FEED ADULTERANTS.

	Protein (N x 6.25) %	Fat (Ether Extract) %	Fiber %	Nitrogen- free Extract %	Water %	Ash %
Corn bran.....	7.00	2.82	11.89	65.44	11.08	1.77
Rice Hulls.....	3.60	0.70	35.70	38.60	8.20	† 13.20
Corn Cobs.....	2.40	0.50	30.10	54.90	10.70	† 1.40
Peanut Hulls.....	4.56	0.81	67.31	-----	-----	2.17
Spanish Peanut Hulls.....	10.12	2.70	31.33	29.98	5.89	19.98
Peanut Middlings.....	8.75	0.88	40.75	-----	-----	16.75
Oat Hulls.....	2.63	1.08	31.49	53.83	5.64	5.33
Wheat Screenings.....	13.88	2.80	3.49	64.71	10.75	4.37
Cotton-seed Hulls with lint.....	3.25	1.12	46.92	40.11	6.05	2.55
Cotton-seed Hulls, delinted.....	2.40	0.31	36.49	50.22	8.20	2.38

ANALYSES OF SAMPLES OF FEEDS, SEASON 1911.

On the following pages will be found the results of the chemical and microscopic analyses of samples of stock feeds collected by the inspectors of the Department, and those sent in by individuals, dealers and manufacturers. A study of these tabulated results will show which brands are pure and come up to the manufacturer's guarantee.

ANALYSES OF WHEAT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3858	Wheat Bran	Harrisonburg Milling Co., Har- risonburg, Va.	Phillips & Penny, Raleigh	Jan. 2, '11	100
3951	do	do	Elmore-Maxwell Co., Greens- boro.	Jan. 8, '11	100
3862	do	Tennessee Mill Co., Estell Springs, Tenn.	Job P. Wyatt & Sons, Raleigh	Jan. 2, '11	100
3952	do	do	Elmore-Maxwell Co., Greens- boro.	Jan. 17, '11	100
3984	do	J. D. Manor & Co., New Mar- ket, Va.	E. H. Lawrence & Co., Dur- ham.	Feb. 7, '11	100
3986	do	do	Southern Pure Food Co., Durham.	Feb. 7, '11	100
3865	do	do	Job P. Wyatt & Sons, Raleigh	Jan. 2, '11	100
3878	Bran	Ballard & Ballard Co., Louis- ville, Ky.	M. T. Norris & Bro., Raleigh	Jan. 3, '11	100
3964	do	do	C. B. Hill, New Bern	Jan. 20, '11	100
5107	do	do	Clark-Smith Co., Belhaven	Mar. 15, '11	100
3880	Wheat Bran	Piedmont Mills, Lynchburg, Va.	E. D. Peebles, Raleigh	Jan. 3, '11	100
3911	do	do	Leak & Martin, Wadesboro	Jan. 10, '11	100
3989	do	do	Southern Pure Food Co., Durham.	Feb. 7, '11	100
5168	do	do	W. J. Pruett, Lumberton	April 5, '11	100
3918	do	Washburn Crosby Milling Co., Louisville, Ky.	Edgar B. Moore, Charlotte	Jan. 12, '11	100
5165	do	do	A. W. Aman, Clinton	April 4, '11	100
3929	do	Dunlap Milling Co., Clarks- ville, Tenn.	Herbert Irwin, Charlotte	Jan. 12, '11	75
3943	do	do	Cramer Bros. Co., Winston- Salem.	Jan. 16, '11	100
5017	do	do	The Patterson Co., Greens- boro.	Feb. 20, '11	100
5099	do	do	J. W. Brooks, Wilmington	Mar. 16, '11	100
5124	do	do	B. F. Mitchell Co., Wilming- ton.	Mar. 18, '11	100
5137	do	do	W. B. Cooper, Wilmington	Mar. 20, '11	100
5249	do	do	W. B. Haymore, Mt. Airy	May 10, '11	100
5039	do	Dunlap Mills, Richmond, Va.	Matthews-Weeks Co., Rocky Mount	Mar. 8, '11	100
5087	do	do	H. C. Edwards, Kinston	Mar. 13, '11	---
3931	do	Henderson Roller Mill Co., Monroe, N. C.	Davidson & Wolff, Charlotte	Jan. 12, '11	75
5064	do	do	do	Mar. 9, '11	75
5091	do	Liberty Mills, Nashville, Tenn.	J. R. McEachern & Sons, Wil- mington.	Mar. 15, '11	100
5206	do	do	City Feed Co., Hickory	April 21, '11	75
5075	do	J. Havens, Washington, N. C.	F. V. Johnson, Greenville	Mar. 10, '11	100
5279	do	do	Manufacturer	June 17, '11	100
5159	do	Lynchburg Milling Co., Lynch- burg, Va.	Royal Feed and Grocery Co., Littleton.	Mar. 31, '11	100
3962	do	Mountain City Mill Co., Chat- tanoga, Tenn.	Burrus & Co., New Bern	Jan. 20, '11	100
5129	do	do	S. P. McNair & Co., Wilming- ton.	Mar. 18, '11	100
3899	do	J. Allen Smith & Co., Knox- ville, Tenn.	A. E. Rankin & Co., Fayette- ville.	Jan. 6, '11	100

BRAN AND MIXED BRANS.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3858	14.50	4.00	9.50	50.00	14.63	4.54	9.95	-----	-----	-----	Wheat bran.
3951	14.50	4.00	9.50	50.00	14.50	3.78	8.07	-----	-----	-----	do.
3862	14.50	5.00	9.50	54.00	14.88	4.42	9.11	-----	-----	-----	do.
3952	14.50	5.00	9.50	54.00	14.63	4.31	9.42	-----	-----	-----	do.
3984	15.75	4.00	7.95	-----	14.38	4.68	9.18	-----	-----	-----	do.
3986	15.75	4.00	7.95	-----	15.19	4.58	10.12	-----	-----	-----	do.
3865	15.75	4.00	7.95	-----	14.88	4.92	8.67	-----	-----	-----	do.
3878	14.50	4.10	9.00	53.00	14.88	4.96	9.46	-----	-----	-----	do.
3964	14.50	4.10	9.00	53.00	15.25	4.24	8.79	-----	-----	-----	do.
5107	15.78	4.42	8.04	-----	15.75	4.83	9.00	54.76	8.40	7.26	do.
3880	14.50	4.00	9.50	54.00	14.88	5.17	9.83	-----	-----	-----	do.
3911	14.50	4.00	9.50	54.00	14.63	4.55	9.03	-----	-----	-----	do.
3989	14.50	4.00	9.50	54.00	14.69	5.16	9.81	-----	-----	-----	do.
5168	14.50	4.00	9.50	54.00	14.88	4.79	10.07	55.27	6.82	8.17	do.
3918	14.50	4.00	9.50	55.00	15.19	4.54	9.69	56.86	7.28	6.44	do.
5165	14.50	4.00	9.50	55.00	14.75	4.22	9.83	57.12	7.67	6.41	do.
3929	14.75	4.00	9.50	57.50	14.38	4.16	9.51	-----	-----	-----	do.
3943	14.75	4.00	9.50	57.50	14.75	4.89	9.26	-----	-----	-----	do.
5017	14.75	4.00	9.50	57.50	14.25	4.56	9.38	-----	-----	-----	do.
5099	14.75	4.00	9.50	57.50	15.75	4.46	8.37	-----	-----	-----	do.
5124	14.75	4.00	9.50	57.50	15.13	4.11	9.39	58.19	7.03	6.15	do.
5137	14.75	4.00	9.50	57.50	17.06	5.05	8.03	-----	-----	-----	do.
5249	14.75	4.00	9.50	57.50	14.75	3.96	8.72	-----	-----	-----	do.
5039	14.50	4.00	9.50	54.00	15.38	5.03	8.60	-----	-----	-----	do.
5087	-----	-----	-----	-----	14.63	4.50	8.59	58.18	7.35	6.75	do.
3931	14.75	4.00	9.00	-----	15.13	4.45	8.80	-----	-----	-----	do.
5064	14.75	4.00	9.00	-----	15.00	4.99	8.55	-----	-----	-----	do.
5091	14.50	4.00	9.50	50.00	16.00	4.51	7.78	-----	-----	-----	do.
5206	14.50	4.00	9.50	50.00	15.38	4.30	9.14	-----	-----	-----	do.
5075	13.00	3.00	10.00	-----	15.25	4.12	6.59	-----	-----	-----	do.
5279	13.00	3.00	10.00	-----	14.63	3.59	5.54	-----	-----	-----	do.
5159	14.50	4.00	9.50	52.00	14.56	4.85	9.86	-----	-----	-----	do.
3962	14.50	4.00	9.50	-----	16.13	3.67	6.51	58.64	9.52	5.53	do.
5129	14.50	4.00	9.50	56.00	15.75	4.47	9.03	57.88	6.45	6.42	do.
3899	14.50	4.00	9.50	52.00	15.75	4.73	8.99	-----	-----	-----	do.

ANALYSES OF WHEAT BRAN

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3866	Wheat Bran	Southern Mills, Nashville, Tenn	Job P. Wyatt & Sons, Raleigh	Jan. 2, '11	100
3885	do	J. P. Sprinkle & Son, Lewisville, N. C.			
3916	do	High Point Milling Co., High Point, N. C.	J. F. Jamison & Co., Charlotte	Jan. 11, '11	75
3937	Mixed Bran	Forsyth Roller Mills, Winston-Salem	Farmers' Trade House Co., Winston-Salem	Jan. 16, '11	100
3966	Bran	Mt. Ulla Roller Mills Co., Mt. Ulla, N. C.	Sent by manufacturer		
3970	Wheat Bran	McNeil Milling Co., Fayetteville, N. C.	Manufacturer	Jan. 28, '11	
5044	do	J. H. Walker & Co., Reidsville, N. C.	W. D. Hightower, Reidsville	Mar. 7, '11	100
5051	do	Concord Milling Co., Concord, N. C.	H. M. Blackwelder, Concord	Mar. 8, '11	100
5104	do	Carolina Roller Mills, Durham, N. C.	J. R. Ferrall & Co., Raleigh	Mar. 20, '11	100
5162	do	Calypso Flour Mills, Calypso, N. C.	J. Walter Johnson, Warsaw	April 3, '11	
5166	do	Smithfield Roller Mills Co., Smithfield, N. C.	A. W. Aman, Clinton	April 4, '11	100
5177	Bran	W. Patten, Calypso, N. C.	Sent by Manufacturer		
5195	Wheat Bran	Blanton Roller Mills, Shelby, N. C.	Newton Grocery Co., Shelby	April 20, '11	75
5213	Bran	Eagle Flouring Mill Co., Sweetwater, Tenn.	Shell Grocery Co., Hickory	April 21, '11	75
5220	Wheat Bran	J. S. Read, Morristown, Tenn.	H. J. Olive, Asheville	April 25, '11	75
5235	do	Graham Milling Co., Graham, N. C.	Sent by Manufacturer		
5241	Winter Wheat Bran	Akin-Eskine Milling Co., Evansville, Ind.	Phillips & Penny, Raleigh	May 5, '11	100
5259	Wheat Bran	Northwestern Consol. Milling Co., Minneapolis, Minn.	Boykin Grocery Co., Wilson	June 12, '11	
5296	Bran	F. W. Stock & Son, Hillsdale, Mich.	Aydlotte Bros. & Co., Elizabeth City	June 22, '11	100
5230	Wheat Bran	Waynesville Milling Co., Waynesville, N. C.	J. C. Bennett, Waynesville	April 26, '11	75
5304	Bran	Landis Milling Co., Landis, N. C.	Sent by Manufacturer		
5359	do	do	do		
5348	Wheat Bran	J. S. Read, Morristown, Tenn.	C. C. Younge, Brevard	Aug. 23, '11	75
5314	do	Holt Granite Mfg. Co., Haw River, N. C.	Southern Feed and Grocery Co., Durham	July 6, '11	75
5318	do	do	Markham-Stephens Co., Durham	July 6, '11	100
5316	Winter Wheat Bran	Akin, Erskine Milling Co., Evansville, Ind.	Southern Feed and Grocery Co., Durham	July 6, '11	100
5311	Wheat Bran	Milton Mill Co., Milton, N. C.	L. Thomas, Oxford	July 6, '11	100

Sixty-two samples of bran were analyzed. Ten are below the guarantee in protein; eight are below the guarantee in fat, and thirteen are above the guarantee in fiber.

AND MIXED BRANS—*Continued.*

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients		
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash			
3866	14.50	4.00	9.50		14.81	4.69	9.67				Wheat bran.		
3885					14.94	3.97	9.11				do.		
3916	15.10	5.18	11.39		15.19	4.48	8.73				do.		
3937	14.50	4.00	9.50		14.19	4.70	9.08				Wheat and corn bran.		
3966					15.25	4.66	6.44				Wheat bran.		
3970					16.19	4.98	8.50				do.		
5044	14.50	4.00	9.50	60.00	14.06	4.46	10.01				do.		
5051	14.50	4.00	9.50		15.25	5.29	10.21	53.41	7.99	7.85	do.		
5104	17.00	4.00	8.25		16.75	5.09	7.98	54.34	9.36	6.48	do.		
5162					15.75	3.96	7.26				do.		
5166	14.50	4.00	9.05	55.00	15.94	3.46	7.25				do.		
5177					16.38	4.20	6.98				do.		
5195	14.50	4.00	11.00		14.31	5.37	8.42				do.		
5213	14.00	4.00	8.50	54.00	16.63	4.68	7.71				do.		
5220	14.00	3.50	11.00	45.00	16.00	4.59	8.50				do.		
5235					14.69	5.87	9.39				do.		
5241	15.66	3.17	10.12		15.69	4.80	7.92				do.		
5259	14.50	4.00	11.00		16.69	5.63	9.06				do.		
5296					14.00	5.43	8.05				do.		
5230	13.00	3.50	8.00		16.00	4.35	6.37				do.		
5304					13.38	3.32	5.16				do.		
5359					14.69	5.02	6.38				do.		
5348	14.00	3.50	11.00	45.00	14.75	4.74	7.59				do.		
5314	14.00	3.55	9.50	50.00	14.75	4.98	7.18				do.		
5318	14.00	3.75	9.50	50.00	14.69	2.86	6.82				do.		
5316	15.66	3.17	10.12		14.69	3.50	6.97				do.		
5311	16.75	4.50	4.71		14.50	5.12	8.09				do.		

ANALYSES OF MID

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5043	Dandy Middlings	Washburn-Crosby Co., Louis- ville, Ky.	J. H. Benton, Reidsville	Mar. 7, '11	100
5204	do.	do.	City Feed Co., Hickory	April 21, '11	100
5218	do.	do.	Wetmore & Houston, Hen- dersonville	April 25, '11	100
5247	Standard Middlings	do.	S. V. Tomlinson, Wilkesboro	May 9, '11	100
5171	Shorts	do.	M. L. Milliken Co., Hamlet	April 6, '11	100
5200	do.	do.	City Feed Co., Hickory	April 21, '11	100
3863	Adrian Flour	Washburn-Crosby Co., Minne- apolis, Minn.	Job P. Wyatt & Sons, Raleigh	Jan. 2, '11	100
3934	do.	do.	Farmers' Stock Co., Winston- Salem.	Jan. 16, '11	100
5033	do.	do.	Geo. S. Edwards & Co., Mar. Rocky Mount.	Mar. 8, '11	100
3936	Standard Middlings	do.	Farmers' Trade House Co., Winston-Salem.	Jan. 16, '11	100
3875	Daisy Middlings	Pillsbury Mills Co., Minneapo- lis, Minn.	Crowder & Rand, Raleigh	Jan. 3, '11	100
3941	do.	do.	J. A. Tate, Winston	Feb. 18, '11	100
5007	do.	do.	W. H. Turner, Winston-Salem	Feb. 18, '11	100
5072	do.	do.	C. B. Keech & Co., Tarboro	Mar. 9, '11	100
5243	do.	do.	The Atkinson Co., Elkin	May 9, '11	100
5002	B. Middlings	do.	W. C. Moye, Goldsboro	Feb. 17, '11	100
3913	Pillsbury Middlings	do.	Leak & Martin, Wadesboro	Jan. 10, '11	100
5132	do.	do.	S. P. McNair & Co., Wil- mington.	Mar. 18, '11	100
5138	do.	do.	W. B. Cooper, Wilmington	Mar. 20, '11	100
3889	Wheat Middlings	C. A. Gambrell Mfg. Co., Balti- more, Md.	A. E. Rankin & Co., Fayette- ville.	Jan. 6, '11	75
3892	do.	do.	J. H. Culbreth & Co., Fay- etteville.	Jan. 6, '11	100
5260	Brown Middlings	do.	Boykin Grocery Co., Wilson	June 12, '11	100
5025	White Middlings	do.	Ruffin-High Co., Wilson	Mar. 7, '11	75
5028	do.	do.	Tomlinson & Co., Wilson	Mar. 7, '11	75
3840	Fancy White Middlings	Bay State Milling Co., Winona, Minn.	Sent by Manufacturer		
3872	Wheat Middlings	Beverly Roller Mills, Broad Run, Va.	L. H. Adams, Raleigh	Jan. 3, '11	100
3876	Wheat Shorts	Southern Indiana Milling Co., Jeffersonville, Ind.	Crowder & Rand, Raleigh	Jan. 3, '11	100
3886	Wheat Middlings	J. P. Sprinkle & Son, Lewis- ville, N. C.	Sent by Manufacturer		
3887	Brown Shorts	do.	do.		
3933	Wheat Middlings	do.	Farmers' Stock Co., Winston	Jan. 16, '11	100
5287	Black Hawk Standard Middlings	Western Flour Mill Co., Davenport, Iowa.	Harrison Bros. Co., Williams- ton.	June .. '11	100
5149	Ben Hur Standard Middlings	Hennepin Mill Co., Minneapo- lis, Minn.	Weldon Grocery Co., Weldon	Mar. 21, '11	100
5154	do.	do.	Littleton Feed and Grocery Co., Littleton.	Mar. 30, '11	100
5157	do.	do.	S. J. Stallings, Littleton	Mar. 30, '11	100
5163	do.	do.	Herring & Hobbs, Warsaw	April 3, '11	100
5169	do.	do.	John P. McNeil, Lumberton	April 5, '11	100

DLINGS OR SHORTS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5043	15.00	4.00	6.00	55.00	17.19	4.01	3.22	63.56	8.39	3.63	Wheat middlings.
5204	15.00	4.00	6.00	55.00	17.63	4.07	2.85	.....	.....	.....	do.
5218	15.00	4.00	6.00	55.00	17.75	4.40	2.90	.....	.....	.....	do.
5247	15.00	4.00	8.00	55.00	17.56	5.63	6.71	.....	.....	.....	do.
5171	14.50	4.00	7.00	55.00	16.31	4.60	8.10	57.30	7.79	5.90	do.
5200	15.00	4.00	6.00	55.00	16.38	4.56	7.64	.....	.....	.....	do.
3863	17.00	5.00	4.00	60.00	19.05	5.19	2.00	.....	.....	.....	do. (Red Dog).
3934	17.00	5.00	4.00	60.00	18.00	4.85	1.76	65.52	7.02	2.85	do.
5033	17.00	5.00	4.00	60.00	18.38	5.66	2.53	61.10	8.78	3.55	do.
3936	15.00	4.00	8.00	55.00	17.06	5.57	8.05	55.25	8.76	5.31	do.
3875	16.00	4.50	4.00	66.00	17.63	4.75	2.04	.....	.....	.....	do.
3941	16.00	4.50	4.00	.....	19.50	4.61	2.21	.....	.....	.....	do.
5007	15.00	4.50	4.00	.....	17.75	4.53	2.07	.....	.....	.....	do.
5072	16.00	4.50	4.00	.....	18.13	4.49	2.34	.....	.....	.....	do.
5243	16.00	4.50	4.00	.....	17.75	4.91	1.82	.....	.....	.....	do.
5002	15.00	4.50	8.00	.....	16.00	5.01	8.83	55.36	8.51	6.29	do.
3913	15.00	4.50	8.00	.....	16.00	5.06	9.31	55.77	7.80	6.06	do.
5132	15.00	4.50	8.00	.....	16.19	4.87	8.86	.....	.....	.....	do.
5138	15.00	4.50	8.00	.....	15.94	4.85	8.85	.....	.....	.....	do.
3889	16.85	4.40	3.00	61.50	16.25	4.90	3.29	.....	.....	.....	do.
3892	16.70	3.50	8.30	55.50	16.13	5.17	8.05	.....	.....	.....	do.
5260	16.70	3.50	8.30	55.50	17.13	5.27	7.30	.....	.....	.....	do.
5025	16.85	4.40	3.00	61.50	15.50	4.31	3.38	65.58	8.15	3.08	do.
5028	16.85	4.40	3.00	61.50	14.50	3.81	2.99	67.91	8.05	2.74	do.
3840	.....	.....	.....	.....	17.75	4.26	3.15	59.73	12.01	3.10	do.
3872	15.00	4.00	6.00	50.00	14.81	3.52	4.09	.....	.....	.....	do.
3876	15.40	4.50	6.00	.....	16.81	4.48	6.99	.....	.....	.....	do.
3886	.....	.....	.....	.....	14.44	3.43	1.99	.....	.....	.....	do.
3887	.....	.....	.....	.....	16.88	5.30	6.35	.....	.....	.....	do.
3933	14.00	4.00	11.00	55.00	13.56	3.04	1.78	.....	.....	.....	do.
5287	17.00	5.70	6.50	60.00	17.94	6.10	5.48	.....	.....	.....	do.
5149	15.00	4.00	8.00	55.00	16.38	5.72	7.69	57.56	7.49	5.16	do.
5154	15.00	4.00	8.00	55.00	18.19	6.33	4.97	.....	.....	.....	do.
5157	15.00	4.00	8.00	55.00	17.63	5.76	7.67	.....	.....	.....	do.
5163	15.00	4.00	8.00	55.00	16.63	5.54	7.46	.....	.....	.....	do.
5169	15.00	4.00	8.00	55.00	17.38	5.60	7.59	.....	.....	.....	do.

ANALYSES OF MID-

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3882	Shorts	Holt-Granite Mfg. Co., Haw River, N. C.	W. A. Myatt, Raleigh	Jan. 3, '11	100
3946	Wheat Shorts	White Star Mills, Staunton, Va	Cramer Bros. Co., Winston- Salem.	Jan. 16, '11	100
5011	Wheat Middlings	do	Forsyth Roller Mills, Wins- ton-Salem.	Feb. 18, '11	100
5014	do	do	Shelton Bros., Winston-Salem	Feb. 18, '11	100
3884	Wheat Shorts	Stuart's Draft Milling Co., Stuart's Draft, Va.	W. A. Myatt, Raleigh	Jan. 3, '11	100
5058	Wheat Middlings	do	Cline & Moose, Concord	Mar. 8, '11	100
5059	Wheat Shorts	do	do	do	100
5246	Wheat Middlings	do	Elkin Roller Mills, Elkin	May 9, '11	100
3879	Superb Red Dog Wheat Feed	Eagle Roller Mills, New Uhn, Minn.	M. T. Norris & Bro., Raleigh	Jan. 3, '11	100
5153	Superb Red Dog Middlings	do	C. T. Stokes, Louisburg	Mar. 30, '11	100
3894	Wheat Middlings	Northwestern Consol. Milling Co., Minneapolis, Minn.	Adams Grain and Provision Co., Fayetteville.	Jan. 6, '11	100
5037	XXX Comet Middlings	do	Matthews-Weeks Co., Rocky Mount.	Mar. 8, '11	100
5254	do	do	Madison Grocery Co., Madi- son.	May 29, '11	100
5273	do	do	C. B. Keech & Co., Tarboro	June 15, '11	100
5013	Wheat Middlings	Dunlap Milling Co., Clarks- ville, Tenn.	Shelton Bros., Winston-Salem	Feb. 18, '11	100
5030	do	do	C. Woodward Co., Wilson	Mar. 7, '11	100
5144	do	do	Hall & Pearsall, Wilmington	Mar. 21, '11	100
5147	do	do	W. J. Kimball, Enfield	Mar. 21, '11	100
3967	Middlings	Mt. Ulla Roller Mills Co., Mt. Ulla, N. C.	Sent by Manufacturer		
5082	Red Dog Middlings	Star and Crescent Mills, Chi- cago, Ill.	Churchill & Co., Kinston	Mar. 13, '11	100
5178	Middlings	W. Patten, Calypso, N. C.	Sent by Manufacturer		
5150	Seal of Minnesota Stand- ard Middlings	New Prague Flour Mill Co., New Prague, Minn.	Lawrence Bros., Enfield	Mar. 21, '11	103
5152	Seal of Minnesota Low Grade Flour	do	McKinnie Bros. Co., Louis- burg.	Mar. 30, '11	100
5267	do	do	Matthews-Weeks Co., Rocky Mount.	June 13, '11	100
5054	Wheat Middlings	J. D. Manor & Co., New Mar- ket, Va.	H. M. Blackwelder, Concord	Mar. 8, '11	100
3904	Middlings	Acme-Evans Co., Indianapo- lis, Ind.	Covington-Hammond Co., Laurinburg.	Jan. 7, '11	100
5083	do	Acme-Evans Co., Richmond, Va.	Churchill & Co., Kinston	Mar. 13, '11	100
5231	Wheat Shorts	Liberty Mills, Nashville, Tenn.	J. C. Bennett, Waynesville	April 26, '11	75
5026	do	do	P. L. Woodard & Co., Wilson	Mar. 7, '11	100
5161	Wheat Middlings	B. A. Eckhart Milling Co., Chi- cago, Ill.	Royall Feed and Grocery Co., Littleton.	Mar. 31, '11	100
5128	Fancy Wheat Shorts	Akin-Erskine Milling Co., Ev- ansville, Ind.	McNair & Pearsall, Wilming- ton.	Mar. 18, '11	100
5214	Wheat Shorts	J. S. Read, Morristown, Tenn.	Green & Kincaid, Morganton	April 21, '11	75
5233	Red Dog Feed	Blish Milling Co., Seymour, Ind.	Asheville Grain and Hay Co., Asheville.	April 29, '11	75
5262	XXX Comet Middlings	Lynchburg Milling Co., Lynch- burg, Va.	Tomlinson & Co., Wilson	June 15, '11	100
5236	Wheat Middlings	Graham Milling Co., Graham, N. C.	Sent by Manufacturer		

OR SHORTS—Continued.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients		
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash			
3882					14.63	3.92	3.65				Wheat Middlings.		
3946	14.50	4.60	8.09		17.00	4.73	7.83				do.		
5011	15.00	4.00	6.03		16.75	4.53	2.48				do.		
5014	15.00	4.00	6.00		16.00	4.12	1.98				do.		
3884	15.00	5.00	6.00	54.00	16.25	4.84	6.89				do.		
5058	16.00	5.00	5.00	54.00	14.63	3.39	1.72				do.		
5059	15.00	5.00	6.00	54.00	15.25	4.16	5.97				do.		
5246	16.00	5.00	5.00	54.00	15.25	3.58	1.51				do.		
3879	16.75	4.75	3.75	60.00	20.13	6.48	3.49				do. (Red Dog).		
5153	18.95	5.35	2.75	58.90	18.69	5.76	3.15	60.47	8.21	3.72	do.		
3894	15.00	4.50	10.00		16.88	5.93	9.80				do.		
5037	16.50	4.00	3.00	60.00	19.56	5.19	2.12				do. (Red Dog).		
5254	16.50	4.00	3.00	60.00	19.44	5.27	1.91				do.		
5273	16.50	4.00	3.00		19.31	5.83	2.24				do.		
5013	16.25	4.60	6.00	62.50	16.63	5.79	6.06	58.83	8.05	4.64	do.		
5030	16.25	4.60	6.00	62.50	16.56	5.23	5.35				do.		
5144	16.25	4.60	6.00	62.50	16.38	4.98	4.98				do.		
5147	16.25	4.60	6.00	62.50	16.81	4.95	5.46				do.		
3967					13.94	4.18	5.27				do.		
5082	16.00	4.00	3.00		17.50	4.54	2.78				do.		
5178					15.38	3.56	3.44				do.		
5150	17.00	5.07	6.05	60.00	18.13	6.94	5.97	56.25	8.18	4.53	do.		
5152	16.50	3.05	1.35	65.00	17.94	3.34	0.67				do. (Red Dog).		
5267	16.50	3.05	1.05	65.00	17.44	3.54	0.39				do.		
5054	16.25	5.00	4.00		15.63	5.42	4.97				do.		
3904	15.00	4.00	8.00	55.00	16.94	5.43	7.04				do.		
5083	15.00	4.00	8.00	55.00	17.50	5.49	6.79				do.		
5231	16.00	4.00	6.00	48.00	13.50	2.63	2.00				do.		
5026	16.00	4.00	6.00	48.00	16.25	4.49	5.29				do.		
5161	15.00	4.00	6.00	60.00	16.81	4.48	6.40				do.		
5128	16.36	4.50	3.90	62.66	17.00	4.87	6.24	59.92	7.14	4.83	do.		
5214	14.50	4.50	7.00	50.00	17.25	4.75	4.87				do.		
5233	15.10	3.40	1.00		17.19	3.75	0.18				do. (Red Dog).		
5262	16.50	4.00	3.00		19.69	5.26	1.67				do.		
5236					15.75	5.83	4.78				do.		

ANALYSES OF MIDLINGS

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5281	Hemlock Flour.....	Adams Grain and Provision Co., Richmond, Va.	W. G. Roberson, Nashville...	June 14, '11	100
5261	Capital Red Dog.....	Aene-Evans Co., Richmond, Va.	Tomlinson & Co., Wilson....	June 12, '11	100
5350	do.....	do.....	Byers Bros., Hendersonville..	Aug. 24, '11	100
5344	Red Dog.....	Bay State Milling Co., Winona, Minn.	C. Woodard Co., Wilson.....	Aug. 2, '11	100
5309	Black Hawk Standard Mid- dlings.	Western Flour Mill Co., Day- enport, Iowa.	Pierce & Ford, Henderson...	July 5, '11	100
5302	White Flour Middlings.....	Cooper Riddick Co., Suffolk, Va.	L. J. Bradley & Co., Jackson	June 29, '11	100

Seventy-seven samples of middlings were analyzed. Thirteen are below the guarantee in protein; eleven are below the guarantee in fat, and thirteen are above the guarantee in fiber.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5116	Wheat Bran and Shorts.....	Koiter Flour Mills, Richmond, Va.	W. T. Hancock Co. Scotland Neck.	Mar. 20, '11	100
5118	do.....	do.....	R. J. Madry, Scotland Neck.	Mar. 20, '11	100
5123	do.....	do.....	B. F. Mitchell & Co., Wil- mington.	Mar. 18, '11	100
5050	do.....	Dunlap Milling Co., Clarks- ville, Tenn.	Overman & Co., Salisbury...	Mar. 8, '11	75
5052	Wheat Bran and Middlings.	Concord Milling Co., Concord, N. C.	H. M. Blackwelder, Concord.	Mar. 8, '11	100
5179	Bran and Shorts.....	Grimes Bros., Lexington, N. C.	W. H. Mofitt, Lexington.....	April 10, '11	100
5189	do.....	W. A. Ware & Co., Kings Moun- tain, N. C.	F. D. Barkley & Co., Gas- tonia	April 19, '11	75
3998	Screenings, Bran and Shorts.	Mt. Ulla Roller Mills Co., Mt. Ulla, N. C.	Sent by Manufacturer.....		
3975	Bran and Shorts.....	Hickory Milling Co., Hickory, N. C.	do.....		
5046	do.....	Salisbury Milling Co., Salis- bury, N. C.	M. S. Varner, Salisbury.....	Mar. 8, '11	75
5190	do.....	Statesville Flour Mill Co., Statesville, N. C.	Armstrong Co., Gastonia...	April 19, '11	75
5201	do.....	do.....	City Feed Co., Hickory.....	April 21, '11	75
5226	do.....	do.....	do.....	May 3, '11	75
5353	do.....	White Pine Milling Co., White Pine, Tenn.	W. L. Barnett, Asheville.....	Aug. 25, '11	75

Fourteen samples of bran and shorts were analyzed. Two are below the guarantee in protein; two are below the guarantee in fat, and two are above the guarantee in fiber.

OR SHORTS—*Continued.*

Laboratory Number	Guarantee						Analysis				Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5281	-----	-----	-----	-----	16.25	3.50	0.23	-----	-----	-----	Wheat middlings. (Red Dog).
5261	17.00	6.00	4.50	55.00	15.44	4.08	3.34	-----	-----	-----	do. do.
5350	16.00	4.75	4.50	59.00	15.56	4.16	3.81	-----	-----	-----	do. do.
5344	19.00	4.00	3.00	55.00	17.44	4.39	1.54	-----	-----	-----	do. do.
5309	17.00	5.70	6.50	60.00	18.19	6.00	5.16	-----	-----	-----	do.
5302	14.20	5.00	5.00	-----	15.63	5.99	4.80	-----	-----	-----	do.

BRAN AND SHORTS.

Laboratory Number	Guarantee						Analysis				Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5116	15.00	4.00	7.53	56.00	16.63	4.75	8.01	57.75	6.80	6.06	Wheat product.
5118	15.00	4.00	7.53	56.00	16.00	4.61	8.07	-----	-----	-----	do.
5123	15.00	4.00	7.53	56.00	17.38	4.75	7.83	-----	-----	-----	do.
5050	15.00	4.00	8.50	57.50	15.50	5.25	7.79	-----	-----	-----	do.
5052	15.87	4.86	6.15	64.75	16.25	5.28	5.62	-----	-----	-----	do.
5179	14.60	4.50	6.47	-----	13.75	3.94	6.44	-----	-----	-----	do.
5189	12.00	4.00	10.00	-----	15.69	4.88	6.74	-----	-----	-----	do.
3968	-----	-----	-----	-----	13.50	3.12	3.71	-----	-----	-----	Wheat product and screenings.
3975	-----	-----	-----	-----	15.75	4.93	7.43	-----	-----	-----	Wheat product.
5046	14.50	4.00	8.00	57.00	14.13	4.86	4.86	-----	-----	-----	do.
5190	16.00	4.00	7.00	60.00	16.38	5.02	6.62	-----	-----	-----	do.
5201	15.00	4.00	7.00	60.00	15.75	3.82	6.96	-----	-----	-----	do.
5226	16.00	4.00	7.00	-----	16.25	4.69	6.05	-----	-----	-----	do.
5353	14.00	4.00	9.50	50.00	15.06	4.59	6.54	-----	-----	-----	do.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5086	Shipstuff	Ballard & Ballard Co., Louisville, Ky.	H. C. Edwards, Kinston	Mar. 13, '11	100
5074	do	do	F. V. Johnson, Greenville	Mar. 10, '11	100
5111	do	do	T. P. Nash, Elizabeth City	Mar. 17, '11	100
3859	do	Piedmont Mills, Lynchburg, Va.	Phillips & Penny, Raleigh	Jan. 2, '11	100
3891	do	do	Adams Grain and Provision Co., Fayetteville	Jan. 6, '11	75
3907	do	do	H. W. Little & Co., Wadesboro	Jan. 10, '11	100
3940	do	do	P. R. Lamb & Co., Winston	Jan. 16, '11	100
3949	do	do	J. A. Tate, Greensboro	Jan. 17, '11	100
3978	do	do	E. H. Lawrence & Co., Durham	Feb. 7, '11	100
3987	do	do	Southern Pure Food Co., Durham	Feb. 7, '11	100
5012	do	do	Forsyth Roller Mills, Winston-Salem	Feb. 18, '11	100
5031	do	do	Boykin Grocery Co., Wilson	Mar. 7, '11	100
5034	do	do	Geo. S. Edwards & Co., Rocky Mount	Mar. 8, '11	100
5098	do	do	J. W. Brooks, Wilmington	Mar. 16, '11	100
5172	do	do	E. N. Rhodes, Hamlet	April 6, '11	100
3897	do	Dunlop Mills, Richmond, Va.	J. W. Carter, Maxton	Jan. 7, '11	100
3864	do	do	Job P. Wyatt & Sons, Raleigh	Jan. 2, '11	100
3992	do	do	Parham Supply Co., Henderson	Feb. 15, '11	100
5038	do	do	Matthews-Weeks Co., Rocky Mount	Mar. 8, '11	100
5151	do	do	Bellamy & Co., Enfield	Mar. 21, '11	100
5188	do	do	F. D. Barkley & Co., Gastonia	April .., '11	100
5244	do	do	The Atkinson Co., Elkin	May 9, '11	100
3944	do	Dan Valley Mills, Danville, Va.	Cramer Bros. Co., Winston	Jan. 16, '11	100
5008	do	do	W. H. Turner, Winston	Feb. 18, '11	100
5018	do	do	The Patterson Co., Greensboro	Feb. 20, '11	100
5173	do	do	Sanford Grocery Co., Sanford	April 7, '11	100
5186	do	do	F. D. Barkley & Co., Gastonia	April 19, '11	100
3932	do	Statesville Flour Mill Co., Statesville, N. C.	Davidson & Wolff, Charlotte	Jan. 12, '11	75
5065	do	do	do	Mar. 9, '11	75
5093	do	do	J. S. McEwern & Sons, Wilmington	Mar. 15, '11	75
5101	do	do	The Stone Co., Wilmington	Mar. 16, '11	100
5135	do	do	The Worth Co., Wilmington	Mar. 18, '11	100
5167	do	do	L. H. Caldwell, Lumberton	April 5, '11	100
5182	do	do	R. W. Freeze & Co., Mooresville	April 18, '11	100
5215	do	do	J. H. Shuping, Morganton	April 24, '11	75

SHIPSTUFF.

Laboratory Number	Guarantee			Analysis						Microscopic Examination Shows the Following Ingredients			
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture				Ash
5086	16.45	4.60	6.42	58.00	16.56	4.49	5.42				Wheat product.		
5074	15.69	4.26	6.87	58.00	16.38	4.02	5.19				do.		
5111	16.45	4.60	6.42	58.00	16.44	4.35	5.19				do.		
3859	15.00	4.00	8.00	58.00	15.88	4.71	7.81				do.		
3891	15.00	4.00	6.00	56.00	16.13	4.62	6.75				do.		
3907	15.00	4.00	6.00	56.00	15.38	4.18	5.97	61.25	8.52	4.70	do.		
3940	15.00	4.00	6.00	56.00	16.06	4.47	6.35				do.		
3919	15.00	4.00	6.00	56.00	16.13	4.53	7.30				do.		
3973	15.00	4.00	8.00	56.00	15.94	4.54	6.71				do.		
3987	15.00	4.00	8.00	56.00	15.75	4.91	7.20				do.		
5012	15.00	4.00	6.00	56.00	15.88	5.88	6.65				do.		
5031	15.00	4.00	6.00	58.00	16.25	5.28	6.05				do.		
5034	15.00	4.00	6.00	56.00	16.38	4.49	6.86				do.		
5098	15.00	4.00	6.00		15.44	4.52	6.93				do.		
5172	15.00	4.00	8.00	56.00	16.44	4.73	7.61				do.		
3897	14.50	4.00	7.00	54.00	16.13	4.52	6.22				do.		
3864	14.50	4.00	7.00	54.00	16.38	5.12	6.51				do.		
3992	14.50	4.00	7.00	54.00	16.25	4.81	6.38				do.		
5038	14.50	4.00	7.00	54.00	15.56	4.67	6.32				do.		
5151	14.50	4.00	7.00	54.00	16.19	4.13	6.15				do.		
5188	14.50	4.00	7.00	54.00	16.81	4.65	6.53				do.		
5244	14.50	4.00	7.00	54.00	16.81	5.07	5.86				do.		
3341	15.00	4.00	6.00	56.00	16.38	4.23	6.94				do.		
5093	15.00	4.00	6.00	56.00	15.63	4.91	6.91	59.68	7.78	5.09	do.		
5018	15.00	4.00	6.00	56.00	16.38	5.26	6.41				do.		
5173	15.00	4.00	8.00	56.00	16.31	4.82	7.40				do.		
5131	16.00	5.00	6.00	65.00	15.00	4.60	7.00				do.		
3932	15.00	4.00	7.00	60.00	15.94	4.66	7.91	58.38	7.49	5.62	Wheat product adulterated with corn bran.		
5035	16.00	4.00	7.00		15.25	4.67	6.46	59.93	8.38	5.28	Wheat product.		
5093	16.00	4.00	7.00	60.00	14.06	4.61	6.60				Wheat product adulterated with corn bran.		
5101	16.00	4.00	7.00	60.00	15.94	5.07	6.94				Wheat product.		
5135	16.00	4.00	7.00	60.00	15.88	4.72	6.79				do.		
5157	16.00	4.00	7.00	60.00	16.56	4.62	6.51				do.		
5132	15.00	4.00	7.00	60.00	15.63	4.12	8.12				do.		
5215	16.00	4.00	7.00	60.00	15.21	4.63	6.66				Wheat product adulterated with corn bran.		

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5225	Shipstuff	Statesville Flour Mill Co., Statesville, N. C.	W. P. McLain, Statesville	May 2, '11	75
3935	do	Forsyth Roller Mills, Winston-Salem, N. C.	Farmers' Trade House Co., Winston-Salem.	Jan. 16, '11	100
3995	do	Lynchburg Milling Co., Lynchburg, Va.	M. J. Best & Sons, Goldsboro.	Feb. 17, '11	100
5158	do	J. Allen Smith & Co., Knoxville, Tenn.	Gem Grocery Co., Littleton.	Mar. 31, '11	100
3979	do	Harrisonburg Milling Co., Harrisonburg, Va.	E. H. Lawrence & Co., Durham.	Feb. 7, '11	100
5057	do	do	H. L. Parks & Co., Concord.	Mar. 8, '11	100
5242	do	do	C. C. Gentry & Co., Elkin.	May 9, '11	100
3993	do	Holt-Granite Mfg. Co., Haw River, N. C.	Geo. A. Rose Co., Henderson.	Feb. 15, '11	100
5103	do	Austin-Heaton Co., Durham, N. C.	J. R. Ferrall & Co., Raleigh.	Mar. 20, '11	100
5175	do	do	J. H. Monger, Sanford.	April 7, '11	100
3950	Red Dog Shipstuff	Eagle Roller Mills, New Ulm, Minn.	Elmore-Maxwell Co., Greensboro.	Jan. 17, '11	100
5010	do	Hubbard Milling Co., Manna-to, Minn.	Forsyth Roller Mills, Winston	Feb. 18, '11	100
5042	Shipstuff	J. H. Walker & Co., Reidsville, N. C.	Harris & Hubbard, Reidsville.	Mar. 7, '11	100
5063	do	Horn-Johnstone Co., Mocksville, N. C.	Davidson & Wolff, Charlotte	Mar. 9, '11	100
5066	do	Ileo Milling Co., Burlington, N. C.	E. E. McAdams, Graham.	Mar. 10, '11	---
5067	do	Hinshaw Roller Mills, Saxapahaw, N. C.	The Thomas Store Co., Graham.	Mar. 10, '11	100
5194	do	Blanton Roller Mills, Shelby, N. C.	Newton Grocery Co., Shelby.	April 20, '11	75
5217	do	Aemie-Evans Co., Richmond, Va.	Wetmur & Houston, Hendersonville.	April 25, '11	100
5240	do	J. D. Manor & Co., New Market, Va.	Phillips & Penny, Raleigh.	May 23, '11	100
5280	do	J. Havens, Washington, N. C.	Manufacturer.	June 17, '11	---
5298	do	E. Trammel & Co., Norfolk, Va.	Weldon Grocery Co., Weldon	June 29, '11	---
5324	do	Austin-Heaton Co., Durham, N. C.	Copeland Bros., Kinston.	July 11, '11	100
5313	do	Milton Mill Co., Milton, N. C.	L. Thomas, Oxford.	July 6, '11	100
5301	do	Holland & Beaman, Suffolk, Va.	Fleetwood & Pruden, Jackson.	June 29, '11	---

Fifty-nine samples of shipstuff were analyzed. Eleven are below the guarantee in protein; eight are below the guarantee in fat, and seventeen are above the guarantee in fiber. Nine samples are adulterated with corn bran.

SHIPSTUFF—Continued.

Laboratory Number	Guarantee			Analysis							Ash	Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture			
5225	16.00	4.00	7.00	60.00	15.13	4.59	6.18					Wheat product adulterated with corn
3935	15.00	4.00	6.00		15.19	4.47	6.19					bran. do.
3995	14.50	4.00	7.00	54.00	17.06	5.13	6.28					Wheat product.
5158	16.50	4.00	7.00	58.00	16.00	3.58	6.69					do.
3979	15.00	4.50	7.00	56.00	16.25	5.48	5.75					do.
5057	15.00	4.50	7.00	50.00	17.50	6.19	5.56					do.
5242	15.00	4.50	7.00	50.00	16.19	5.31	5.21					do.
3993	15.00	4.00	6.00	60.00	16.63	5.42	6.60					do.
5103	16.00	4.50	5.50	64.00	15.44	4.70	7.16	58.73	8.77	5.20		Wheat product adulterated with corn
5175	16.00	4.50	5.50	64.00	14.94	4.23	6.88					bran. do.
3950	18.95	5.35	2.75	58.90	19.25	5.56	3.07					Wheat middlings (Red Dog).
5010	15.02	4.04	5.09		17.44	4.65	5.13					Wheat product.
5042	15.00	4.50	4.50	65.00	15.25	4.63	4.83					do.
5063	15.00	5.00	4.25		14.25	4.13	5.04					Wheat product adulterated with corn
5066	15.20	4.30	8.00		15.69	4.10	6.21					Wheat product.
5067	14.50	4.00	8.00	57.00	13.94	3.45	4.50					do.
5194	15.19	3.61	3.26	69.76	15.69	3.08	1.70					do.
5217	15.50	4.00	2.00		18.31	5.64	2.12					do.
5240	16.37	5.68	3.83		16.88	5.47	4.60					do.
5280	13.00	3.00	10.00		11.63	1.89	0.89					do.
5298					17.05	5.10	10.34					do.
5324	16.00	4.50	5.50	64.00	14.63	3.98	4.14					Wheat product adulterated with corn
5313	16.75	4.50	4.71		16.13	4.66	4.07					bran. Wheat product.
5301					15.69	4.16	5.50					do.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3947	Rye Middlings	Bay State Milling Co., Winona, Minn.	Elmore-Maxwell Co., Greensboro.	Jan 17, '11	100
5041	do.	North Star Feed and Cereal Co., Minneapolis, Minn.	Hutchinson Bros., Reidsville.	Mar. 7, '11	100
5315	do.	Washburn-Crosby Co., Minneapolis, Minn.	Southern Feed and Grocery Co., Durham.	July 16, '11	100

Three samples of rye feeds were analyzed. All are up to the guarantee.

ANALYSES OF CORN

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5113	Mixed Corn and Oat Feed	W. R. White & Co., Elizabeth City, N. C.	Manufacturer	Mar. 17, '11	100
5294	do.	do.	T. P. Nash & Son, Elizabeth City.	June 22, '11	100
5004	Corn and Oat Chops.	J. W. Isler & Co., Goldsboro, N. C.	Manufacturer	Feb. 17, '11	100
5323	do.	do.	M. G. Best & Sons, Goldsboro	July 11, '11	100
5327	Feed	P. A. Hooker, Kinston, N. C.	Manufacturer	July 11, '11	75
5354	Cracked Corn and Oats	do.	Sent by manufacturer.		

Six samples of corn and oat feeds were analyzed. Three are below the guarantee in protein and three are below the guarantee in fat.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5120	Rice Meal	Carolina Rice Mills, Goldsboro, N. C.	R. J. Madry, Scotland Neck	Mar. 20, '11	100
5069	do.	do.	J. B. Cummings & Son, Tarboro.	Mar. 9, '11	100
3998	do.	do.	B. G. Thompson Co., Goldsboro.	Feb. 17, '11	100
3999	Victor Rice Bran	H. G. Leiding Co., Charleston, S. C.	Bizzell & Thornton, Goldsboro.	Feb. 17, '11	100
5276	do.	do.	R. B. Peters Grocery Co., Tarboro.	June 15, '11	100

RYE FEEDS.

Laboratory Number	Guarantee				Analysis					Microscopic Examination Shows the Following Ingredients	
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture		Ash
3947	14.72	2.08	6.00	.....	15.50	3.75	4.94	62.24	8.73	4.84	Rye middlings
5041	14.50	1.50	5.20	63.10	16.63	3.28	4.53	62.70	8.83	4.03	do.
5315	14.00	3.00	6.00	60.00	16.13	4.02	4.82	.....	.....	.....	do.

AND OAT FEEDS.

Laboratory Number	Guarantee				Analysis					Microscopic Examination Shows the Following Ingredients	
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture		Ash
5113	11.44	4.92	8.82	.....	8.25	5.16	3.91	.....	.....	.....	Cracked corn and oats.
5294	11.44	4.92	8.82	.....	9.25	4.16	3.64	.....	.....	.....	do.
5004	9.75	5.00	5.00	70.00	9.38	4.32	4.99	.....	.....	.....	Ground corn and oats.
5323	9.75	5.00	5.00	70.00	9.63	4.18	3.51	.....	.....	.....	do.
5327	9.00	4.00	5.00	70.00	9.50	3.88	4.07	.....	.....	.....	Cracked corn and oats
5354	.....	.....	.....	.....	10.13	4.47	4.42	.....	.....	.....	do.

RICE FEEDS.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5120	12.00	9.00	8.00	60.00	13.38	10.33	7.73	.....	.....	.....	Rice product.
5069	12.00	9.00	8.00	60.00	12.19	13.02	11.50	45.20	7.22	10.87	do.
3998	12.00	9.00	8.00	60.00	11.44	12.37	11.35	46.18	7.87	10.79	do.
3999	12.50	12.00	10.00	40.00	13.06	12.91	7.94	50.21	8.26	7.62	do.
5276	12.50	12.00	12.50	40.00	12.94	12.94	9.06	.....	.....	.....	do.

ANALYSES OF RICE

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5027	Rice Bran.....	Empire Rice Mill Co., New Orleans, La.	P. L. Woodard & Co., Wilson.	Mar. 7, '11	150
5121	do.....	do.....	Pearsall & Co., Wilmington.	Mar. 21, '11	150
3847	do.....	People's Rice Mill, Crowley, La.	O. H. Wright & Co., Wilmington.	.....	.....
5268	do.....	Bloom's Son Co., New Orleans, La.	W. S. Clark & Son, Tarboro.	June 15, '11	125
3841	do.....	Cohn & Co., New Orleans, La.	O. H. Wright & Co., Wilmington.	Oct. 19, '11	150

Ten samples of Rice Feeds were analyzed. Two are below the guarantee in protein; two are above the guarantee in fiber. One sample, No. 5268, is adulterated with a large amount of rice hulls.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3861	Sucrene Dairy Feed.....	American Milling Co., Chicago, Ill.	Job P. Wyatt & Sons, Raleigh.	Jan. 2, '11	100
3900	do.....	do.....	J. H. Culbreth & Co., Fayetteville.	Jan. 6, '11	100
5140	do.....	do.....	O. H. Wright & Co., Wilmington.	Mar. 20, '11	100
5211	do.....	do.....	City Feed Co., Hickory.	April 21, '11	100
5139	Sucrene Horse and Mule Feed.	do.....	O. H. Wright & Co., Wilmington.	Mar. 20, '11	100
3870	do.....	do.....	Job P. Wyatt & Sons, Raleigh.	Jan. 2, '11	100
3948	do.....	do.....	Elmore-Maxwell Co., Greensboro.	Jan. 17, '11	100
3960	do.....	do.....	C. L. Spencer, New Bern.	Jan. 20, '11	100
3902	Seocotes.....	Southern Cotton Oil Co., Charlotte, N. C.	Adams Grain and Provision Co., Fayetteville.	Jan. 6, '11	100
3919	do.....	do.....	Adams Grain and Provision Co., Charlotte.	Jan. 12, '11	100
3977	do.....	do.....	E. H. Lawrence & Co., Durham.	Feb. 7, '11	100
5055	do.....	do.....	H. M. Blackwelder, Concord.	Mar. 8, '11	100
5207	do.....	do.....	City Feed Co., Hickory.	April 21, '11	100
5272	Badger Dairy Feed.....	Chas. A. Krause Milling Co., Milwaukee, Wis.	F. L. Johnson, Greenville.	June 16, '11	100
5079	Badger Alfalfa Horse and Mule Feed.	do.....	F. G. Paul & Bro., Washington.	Mar. 11, '11	100
5131	Perfection Horse Feed.....	Omaha Alfalfa Milling Co., Omaha, Neb.	S. P. McNair & Co., Wilmington.	Mar. 18, '11	100
5232	do.....	do.....	Asheville Grain and Hay Co., Asheville.	April 29, '11	100

FEEDS—Continued.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo-hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5027	12.00	13.00	11.00	44.00	11.94	12.88	9.41	47.64	7.33	10.80	Rice bran
5121	13.00	13.00	11.00	44.00	13.00	14.12	7.09	49.92	7.06	8.81	do.
3847	-----	-----	-----	-----	13.50	15.57	8.33	45.50	8.10	9.00	do.
5268	-----	-----	-----	-----	8.38	7.91	21.11	-----	-----	-----	Rice product adulterated with rice hulls, contains 33.66 per cent rice hulls.
3841	-----	-----	-----	-----	9.63	9.01	10.92	-----	-----	-----	Rice bran, low grade.

MOLASSES FEEDS.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo-hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3861	16.50	3.50	12.00	46.00	18.31	6.53	12.03	-----	-----	-----	Wheat screenings, oat hulls, corn meal, cotton-seed meal, malt sprouts and molasses.
3900	16.50	3.50	12.00	46.00	14.06	3.12	10.52	55.97	8.65	7.68	do.
5140	16.50	3.50	12.00	46.00	14.94	4.63	11.12	-----	-----	-----	do.
5211	16.50	3.50	12.00	46.00	17.75	3.88	11.52	-----	-----	-----	do.
5139	10.00	3.50	12.00	50.00	9.38	3.55	8.14	-----	-----	-----	Cracked corn, barley, screenings, linseed meal and molasses.
3870	10.00	3.50	12.00	50.00	10.50	3.76	8.12	-----	-----	-----	Cracked corn, corn meal, screenings and molasses.
3948	10.00	3.50	12.00	50.00	12.63	3.59	9.84	56.82	9.10	8.02	Cracked corn, screenings, barley and molasses.
3960	10.00	3.50	12.00	50.00	16.63	3.41	8.28	-----	-----	-----	do.
3902	12.00	3.50	12.00	50.00	12.94	5.57	9.59	58.64	8.03	5.23	Cracked corn, rice product, cotton-seed meal, ground pea vine hay and molasses.
3919	12.00	3.50	12.00	50.00	13.25	5.44	8.87	59.82	7.57	5.05	do.
3977	12.00	3.50	12.00	50.00	14.88	5.98	9.13	-----	-----	-----	do.
5055	12.00	3.50	12.00	50.00	13.63	6.46	10.20	-----	-----	-----	do.
5207	12.00	3.50	12.00	50.00	12.75	5.07	7.15	-----	-----	-----	do.
5272	16.00	3.50	12.00	-----	17.75	3.57	12.83	-----	-----	-----	Screenings, cotton-seed meal, brewer's grains, malt sprouts, corn product and molasses.
5079	10.00	2.50	12.00	-----	11.75	3.59	8.56	62.36	7.94	5.80	Alfalfa meal, cracked corn, oat products and molasses.
5131	10.00	3.50	12.00	55.00	11.38	3.53	10.60	-----	-----	-----	Cracked corn, oats, alfalfa meal and molasses.
5232	10.00	3.50	12.00	55.00	11.00	3.46	7.38	-----	-----	-----	do.

ANALYSES OF MOLAS

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3873	Sugarine Dairy Feed	The Sugarine Co., Chicago, Ill.	F. B. Phillips, Raleigh	Jan. 3, '11	100
3994	do.	do.	M. J. Best & Sons, Goldsboro.	Feb. 17, '11	100
3881	Crystalloid Dairy Feed	Jonas F. Eby & Son, Lancaster, Pa.	W. A. Myatt, Raleigh	Jan. 3, '11	100
5141	Dairy Feed	International Sugar Feed Co., Minneapolis, Minn.	O. H. Wright & Co., Wilming-	Mar. 20, '11	100
5360	Hammond Dairy Feed	Western Grain Products Co., Hammond, Ind.	Burrus & Co., New Bern	Sept. 28, '11	100

Twenty-two samples of Molasses Feeds were analyzed. Five are below the guarantee in protein; one is below the guarantee in fat, and one is above the guarantee in fiber.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3895	Corno Horse and Mule Feed	The Corno Mills Co., St. Louis, Mo.	Adams Grain and Provision Co., Fayetteville	Jan. 6, '11	100
3965	do.	do.	New Bern Fruit Co., New Bern.	Jan. 20, '11	100
5019	do.	do.	The Patterson Co., Greensboro.	Feb. 20, '11	100
5032	do.	do.	Boykin Grocery Co., Wilson.	Mar. 7, '11	100
5248	do.	do.	W. B. Haymore, Mt. Airy	May 10, '11	100
3903	Purina Feed	Ralston Purina Co., St. Louis, Mo.	Covington & Hammond, Laurinburg.	Jan. 7, '11	75
3958	do.	do.	C. L. Spencer, New Bern	Jan. 20, '11	100
5265	Cereola Cow Feed	do.	Geo. J. Hales & Bro., Rocky Mount.	June 13, '11	...
3942	Kornfalfa Feed	Kornfalfa Feed Milling Co., Kansas City, Mo.	Cramer Bros. & Co., Winston	Jan. 16, '11	100
3997	do.	do.	B. G. Thompson Co., Goldsboro.	Feb. 17, '11	100
5193	do.	do.	J. Flem. Johnson & Co., Gastonia.	April 19, '11	100
5321	Pioneer Alfalfa Meal	do.	H. A. Powell Grocery Co., Goldsboro.	July 11, '11	100
5000	Caronoca	Carolina Rice Mills, Goldsboro.	Bizzell & Thornton, Goldsboro.	Feb. 17, '11	100
5071	do.	do.	D. Lichtenstein Co., Tarboro	Mar. 19, '11	100
5084	do.	do.	Churchill & Co., Kinston	Mar. 13, '11	100
5115	do.	do.	W. S. White & Co., Elizabeth City.	Mar. 17, '11	100
5117	do.	do.	Cash Grocery Co., Scotland Neck.	Mar. 20, '11	100
5048	Alfacorn Feed	Lester Milling Co., Nashville, Tenn.	Thompson Grain and Feed Store, Salisbury.	Mar. 8, '11	100
5003	Alfalfa Meal	J. Bolgiano & Son, Baltimore, Md.	J. W. Isler & Co., Goldsboro	Feb. 17, '11	100

SES FEEDS—*Continued.*

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo-hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3873	16.50	3.50	12.00	46.00	16.69	4.59	10.86	-----	-----	-----	Screenings, oat hulls, cotton-seed meal, weed seed and molasses
3994	16.50	3.50	12.00	46.00	16.00	4.45	11.86	48.25	8.91	10.53	do.
3881	16.50	3.50	12.00	46.00	16.63	4.83	11.78	-----	-----	-----	Screenings, wheat product, cotton-seed meal, malt sprouts and molasses.
5141	16.50	3.50	12.00	52.50	16.38	4.98	13.73	47.94	8.35	8.62	Screenings, cotton-seed meal, oat products and molasses.
5360	17.00	3.00	11.00	50.00	16.50	4.92	10.26	-----	-----	-----	Screenings, light oats, distiller's grains, cotton-seed meal, malt sprouts and molasses.

ALFALFA FEEDS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo-hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3895	10.00	3.50	12.00	58.50	10.44	3.72	12.77	-----	-----	-----	Alfalfa meal, cracked corn and oat products.
3965	10.00	3.50	12.00	58.50	10.88	3.42	13.33	57.40	9.72	5.25	do.
5019	10.00	3.50	12.00	58.50	10.50	3.70	12.16	58.46	5.99	9.25	do.
5032	10.00	3.50	12.00	58.50	11.75	4.00	12.53	-----	-----	-----	do.
5248	10.00	3.50	12.00	58.50	11.25	4.02	12.98	-----	-----	-----	do.
3903	12.50	4.00	8.90	58.00	12.69	4.39	10.69	60.40	7.66	4.17	Alfalfa meal, cracked corn, oats, dried brewer's grains.
3958	12.50	4.00	8.90	58.00	13.25	4.09	9.91	-----	-----	-----	do.
5265	16.00	5.00	12.00	55.00	15.81	4.93	11.46	-----	-----	-----	Cracked corn, dried brewer's grains, alfalfa meal, cotton-seed meal.
3942	11.00	3.50	12.00	60.00	11.38	3.50	12.55	58.24	8.95	5.38	Alfalfa meal, cracked corn, corn meal and oats.
3997	11.00	3.50	12.00	60.00	11.13	3.19	10.82	-----	-----	-----	do.
5193	11.00	3.50	12.00	60.00	11.19	3.58	9.52	64.47	7.00	4.15	do.
5321	12.00	1.50	35.00	40.00	15.44	2.94	25.33	-----	-----	-----	Alfalfa meal.
5000	12.25	8.00	14.00	61.12	11.25	8.97	16.19	43.46	8.18	11.95	Alfalfa meal and rice product.
5071	12.25	8.00	14.00	61.12	11.31	8.25	18.36	-----	-----	-----	do.
5084	12.25	8.00	14.00	61.12	11.19	7.76	18.35	-----	-----	-----	do.
5115	12.25	8.00	14.00	61.12	13.50	9.07	13.48	-----	-----	-----	do.
5117	12.25	8.00	14.00	61.12	13.00	9.95	12.43	-----	-----	-----	do.
5048	12.75	4.15	9.75	61.00	11.50	4.28	11.24	59.70	8.90	4.38	Alfalfa meal, cracked corn and oats
5003	-----	-----	-----	-----	14.13	2.56	29.16	36.70	7.14	10.31	Alfalfa meal.

ANALYSES OF AL

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3959	Acme Dairy Food.....	American Alfalfa Food Co., Wichita, Kan.	C. L. Spencer, New Bern.....	Jan. 20, '11	100
5297	Alfalfa Meal.....	Smith & Hazelhurst, Balti- Md.	Carolina Distributing Co., Washington.	June 26, '11	100
5143	Star Feed.....	Illinois Feed Mills, St. Louis, Mo.	Hall & Pearsall, Wilmington.	Mar. 21, '11	100
3877	Purina Feed.....	Ralston Purina Co., St. Louis, Mo.	M. T. Norris & Bro., Raleigh.	Jan. 3, '11	100
5349	True Tag Mixed Feed.....	Lewis & Adcock, Knoxville, Tenn.	C. C. Young, Brevard.....	Aug. 23, '11	100
5337	Perfection Horse Feed.....	Omaha Alfalfa Milling Co., Omaha, Neb.	Jas. I. Metts, Wilmington....	July 17, '11	100
5322	Badger Alfalfa Horse and Mule Feed.	Chas. A. Krause Milling Co., Milwaukee, Wis.	W. C. Moye & Sons, Golds- boro.	July 11, '11	100
5331	Puritan Alfalfa Feed.....	J. M. Gwaltney Co., Norfolk, Va.	C. L. Spencer, New Bern.....	July 12, '11	100

Twenty-seven samples of Alfalfa Feeds were analyzed. Seven are below the guarantee in protein; two are below the guarantee in fat, and fourteen are above the guarantee in fiber.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3874	Dried Beet Pulp.....	Larowe Milling Co., Detroit, Mich.	F. B. Phillips, Raleigh.....	Jan. 3, '11	100
3988	do.....	do.....	Southern Pure Food Co., Durham.	Feb. 7, '11	100
5015	do.....	do.....	Shelton Bros., Winston- Salem.	Feb. 18, '11	100
3961	do.....	German-American Sugar Co., Bay City, Mich.	Burrus & Co., New Bern.....	Jan. 20, '11	100
5076	do.....	do.....	F. V. Johnson, Greenville....	Mar. 10, '11	100
5036	do.....	Michigan Sugar Co., Saginaw, Mich.	Geo. J. Hales & Bro., Rocky Mount.	Mar. 8, '11	100

Six samples of dried beet pulp were analyzed. All come up to their guarantees.

ALFALFA FEEDS—Continued.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3959	12.00	3.20	12.49	49.47	9.75	2.54	10.05	-----	-----	-----	Alfalfa meal, wheat bran, cracked corn.
5297	-----	-----	-----	-----	12.19	2.30	33.15	-----	-----	-----	Alfalfa meal.
5143	12.00	3.80	9.70	57.00	12.25	3.81	10.99	-----	-----	-----	Alfalfa meal, cracked corn, oats, dried brewer's grains.
3877	12.50	4.00	6.90	58.00	12.88	5.18	9.81	-----	-----	-----	do.
5349	10.00	4.00	10.00	50.00	10.75	4.27	7.90	-----	-----	-----	Alfalfa meal, rolled oats, cracked corn.
5337	10.50	3.50	12.00	55.00	10.19	3.48	7.40	-----	-----	-----	Alfalfa meal, cracked corn, oats, molasses
5322	10.00	2.50	12.00	-----	10.63	4.51	7.26	-----	-----	-----	Alfalfa meal, cracked corn, oat products, molasses.
5331	11.00	3.50	10.00	-----	9.88	3.45	7.68	-----	-----	-----	Alfalfa meal, cracked corn and oats.

DRIED BEET PULP.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3874	8.00	0.50	20.00	-----	8.38	1.19	18.75	-----	-----	-----	Dried beet pulp.
3988	8.00	0.50	20.00	60.00	9.25	0.84	19.20	-----	-----	-----	do.
5015	8.00	0.50	20.00	60.00	8.94	0.92	19.02	60.08	6.78	4.26	do.
3961	8.00	0.50	20.00	60.00	10.88	0.87	18.50	57.09	8.47	4.19	do.
5076	8.00	0.50	20.00	60.00	8.88	0.70	18.30	-----	-----	-----	do.
5036	8.00	0.50	20.00	60.00	8.62	0.84	18.58	-----	-----	-----	do.

ANALYSES OF CHOP

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5203	do.	Lewis & Adeock, Knoxville, Tenn.	City Feed Co., Hickory	April 21, '11	100
5224	do.	do.	Carolina Flour and Feed Co., Statesville.	May 2, '11	100
5223	Yellow Corn Chops	do	J. E. Sloop, Statesville.	May 2, '11	100
3956	Corn Chops	Boney & Harper, Wilmington, N. C.	C. L. Spencer, New Bern.	Jan. 20, '11	100
5094	do.	do.	J. S. McEachern & Sons, Wilmington.	Mar. 15, '11	100
3909	Hominy Feed	Liberty Mills, Nashville, Tenn.	J. D. Horn, Wadesboro.	Jan. 10, '11	100
5198	do.	do.	Wanpum Dept. Store, Lincoln.	April 20, '11	75
5250	Corn Chops	Granite City Mills Mt. Airy, N. C.	Mt. Airy Feed Store, Mt. Airy.	May 10, '11	100
3972	Mixed Chops	J. P. Sprinkle & Son, Lewisville, N. C.	Sent by manufacturer.	Jan. 24, '11	100
3888	Corn Chops	do	do.	do.	do.
5005	Corn Bran	J. H. Culbreth, Fayetteville, N. C.	do.	do.	do.
5156	Hominy Feed	Southern Milling Co., Nashville, Tenn.	Littleton Feed and Grocery Co. Littleton.	Mar. 30, '11	100
5307	do.	do.	do.	June 30, '11	100
5358	Mixed Chops	Landis Milling Co., Landis, N. C.	Sent by manufacturer.	do.	do.

Fourteen samples of Chop Feeds were analyzed. Three are below the guarantee in protein; four are below the guarantee in fat, and three are above the guarantee in fiber.

ANALYSES OF COT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3982	Durham Brand Cotton-seed Feed	Florida Cotton Oil Co., Jacksonville, Fla.	E. H. Lawrence & Co., Durham.	Feb. 7, '11	100
3973	do.	do.	C. O. Ball, Raleigh	do.	do.
5001	do.	do.	W. C. Moye, Goldsboro	Feb. 17, '11	100
5009	do.	do.	Forsyth Roller Mills, Winston	Feb. 18, '11	100
5100	do.	do.	J. W. Brooks, Wilmington	Mar. 16, '11	100
5136	do.	do.	Brown-Toon Co., Wilmington.	Mar. 18, '11	100
3938	Cremo Brand Cotton-seed Feed Meal.	Tennessee Fiber Co., Memphis, Tenn.	P. R. Lamb & Co., Durham.	Jan. 16, '11	100
3945	do.	do.	Cramer Bros. Co., Winston-Salem.	Jan. 16, '11	100
3981	do.	do.	E. H. Lawrence & Co., Durham.	Feb. 7, '11	100
5006	do.	do.	W. H. Turner, Winston.	Feb. 18, '11	100
5208	do.	do.	City Feed Co., Hickory	April 21, '11	100

FEEDS AND MEALS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5203	14.00	5.50	10.00	.....	16.63	8.51	4.84	.....	.....	.....	Corn product.
5224	11.00	5.50	10.00	.....	16.50	8.51	5.29	.....	.....	.....	do.
5223	.....	.....	.....	.....	8.50	3.99	2.07	.....	.....	.....	Cracked corn.
3956	10.00	8.75	7.75	70.00	9.75	8.82	8.10	.....	.....	.....	Corn product, composed largely of bran and gum.
5094	10.00	6.75	7.75	70.00	8.75	6.94	11.26	65.03	5.36	2.66	do.
3909	10.50	10.00	6.31	50.00	11.31	8.39	5.10	.....	.....	.....	do.
5198	10.50	10.00	6.31	50.00	11.19	8.14	4.94	.....	.....	.....	do.
5250	9.50	3.85	6.45	.....	9.50	3.62	7.23	.....	.....	.....	Corn product.
3972	.....	.....	.....	.....	10.56	3.91	3.91	.....	.....	.....	Wheat and corn product.
3888	.....	.....	.....	.....	8.75	4.38	2.12	.....	.....	.....	Corn product.
5005	.....	.....	.....	.....	7.25	2.88	12.90	.....	.....	.....	Corn bran.
5156	10.50	10.00	6.31	50.00	10.06	8.21	6.17	.....	.....	.....	Corn product.
5307	10.50	10.00	6.31	50.00	10.38	8.71	5.98	.....	.....	.....	do.
5358	.....	.....	.....	.....	10.06	3.36	1.94	.....	.....	.....	Wheat and corn product.

TON-SEED FEEDS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3982	25.00	7.00	15.00	40.00	25.81	7.09	15.70	38.75	7.16	5.49	Cotton-seed meal and hulls.
3973	.....	.....	.....	.....	23.56	7.25	20.30	.....	.....	.....	do.
5001	25.00	7.00	15.00	40.00	24.25	6.57	18.09	38.17	7.73	5.19	do.
5009	25.00	7.00	15.00	40.00	22.94	6.01	19.71	.....	.....	.....	do.
5100	25.00	7.00	15.00	40.00	23.13	6.57	16.43	.....	.....	.....	do.
5136	25.00	7.00	15.00	40.00	25.44	7.17	17.77	.....	.....	.....	do.
3938	20.00	4.00	22.00	38.00	20.56	5.49	21.33	42.01	5.38	5.23	do.
3945	20.00	4.00	22.00	38.00	23.88	4.67	22.40	.....	.....	.....	do.
3981	20.00	5.00	22.00	38.00	23.00	4.73	21.80	.....	.....	.....	do.
5006	20.00	4.00	22.00	38.00	21.00	4.66	23.54	.....	.....	.....	do.
5208	20.00	5.00	22.00	38.00	26.94	5.52	17.71	.....	.....	.....	do.

ANALYSES OF COTTON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5114	Cotton-seed Meal.....	Baldwin, Prince & Co., Norfolk, Va.	W. R. White & Co., Elizabeth City.	Mar. 17, '11	100
5045	Cotton-seed Feed.....	Arey Oil and Fertilizer Co., Salisbury, N. C.	M. R. Varner, Salisbury.....	Mar. 8, '11	100
3917	Cotton-seed Feed Meal.....	Clover Cotton Oil and Ginning Co., Clover, S. C.	J. Flem. Johnson & Co., Charlotte.	Jan. 11, '11	----
5040	Cotton-seed Feed.....	Elba Mfg. Co., Charlotte, N. C.	Hutcherson Bros., Reidsville.	Mar. 7, '11	100
3991	do.....	do.....	Sent by manufacturer.....	-----	-----
3851	Cotton-seed Cake.....	Mt. Gilead Cotton Oil Co., Mt. Gilead, N. C.	do.....	-----	-----
3848	do.....	do.....	do.....	-----	-----
3849	do.....	do.....	do.....	-----	-----
3837	Cotton-seed Meal Feed.....	Sent by L. C. Huffles, Guilford College, N. C.	-----	-----	-----
5060	Sico Cold Pressed Feed Meal.....	Sea Island Cotton Oil Co., Charleston, S. C.	Charles Moody Co., Charlotte.	Mar. 9, '11	100
5341	do.....	do.....	Garrett & McNeil, Red Springs.	July 18, '11	100
5234	Cotton Mixed Feed.....	Imperial Cotton Oil Co., Statesville, N. C.	Sent by manufacturer.....	-----	-----
5068	Ko-Pres-Ko.....	Universal Oil and Fertilizer Co., Wilmington, N. C.	Thomas Store Co., Graham..	Mar. 10, '11	100
5239	do.....	do.....	W. A. Myatt, Raleigh.....	May 23, '11	100
3954	Cotton-seed Feed Meal.....	J. Lindsay Wells Co., Memphis, Tenn.	J. A. Meadows, New Bern.....	Jan. 20, '11	100
5126	Cotton-seed Meal.....	do.....	D. L. Gore Co., Wilmington.	Mar. 18, '11	100
5049	Perfecto Cotton-seed Feed ..	Southern Cotton Oil Co., Charlotte, N. C.	Thompson Grain and Feed Store, Salisbury.	Mar. 8, '11	100
5343	Boveta Feed.....	do.....	Sikes-Johnson Co., Red Springs.	July 18, '11	100
5016	Royal Feed.....	Southern Fiber Co., Portsmouth, Va.	The Patterson Co., Greensboro.	Feb. 20, '11	100

Thirty samples of Cotton-seed Feeds were analyzed. Seven are below the guarantee in protein; four are below the guarantee in fat, and fourteen are above the guarantee in fiber.

ANALYSES OF PEANUT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5134	Peanut Meal.....	Universal Oil and Fertilizer Co., Wilmington, N. C.	Brown-Toon Co., Wilmington.	Mar. 18, '11	100
3853	Peanut Hulls.....	Sent by Geo. A. Holderness, Tarboro, N. C.	-----	-----	-----

One sample of Peanut Meal was analyzed. This is below the guarantee in protein and fat and above the guarantee in fiber.

SEED FEEDS—Continued.

Laboratory Number	Guarantee			Analysis							Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5114	38.62	7.00	8.00	.....	37.13	9.02	8.81	.....	.....	.....	Cotton-seed meal.
5045	10.00	2.50	10.00	70.00	11.51	2.61	34.01	.....	.....	.....	Cotton-seed hulls and meal.
3917	.....	.....	.....	.....	38.31	7.82	10.07	.....	.....	.....	Cotton-seed meal.
5040	10.00	2.50	40.00	70.00	12.00	2.64	39.95	.....	.....	.....	Cotton-seed hulls and meal.
3991	.....	.....	.....	.....	13.88	2.92	33.84	.....	.....	.....	do.
3851	.....	.....	.....	.....	23.00	8.26	23.06	34.29	6.52	4.87	Cold pressed cotton-seed cake.
3848	.....	.....	.....	.....	26.13	10.27	20.38	31.19	7.12	4.91	do.
3849	.....	.....	.....	.....	22.00	7.06	21.85	36.51	7.88	4.70	do.
3837	.....	.....	.....	.....	36.50	7.11	8.91	.....	.....	.....	Cotton-seed meal and hulls.
5060	26.00	6.00	15.00	40.00	26.63	8.78	15.90	36.11	6.94	5.64	Cold pressed cotton-seed meal.
5311	26.00	6.00	15.00	40.00	23.75	6.09	17.46	.....	.....	.....	do.
5234	.....	.....	.....	.....	15.56	4.28	31.93	.....	.....	.....	Cotton seed hulls and meal.
5068	28.00	5.50	17.00	40.00	23.50	14.17	18.47	.....	.....	.....	Cold pressed cotton-seed cake.
5239	23.00	5.50	17.00	40.00	23.00	9.44	20.61	.....	.....	.....	do.
3954	15.60	5.00	8.00	38.00	21.25	4.80	22.68	37.50	9.06	4.71	Cotton-seed meal and hulls.
5126	45.00	8.00	10.00	.....	40.63	7.80	8.17	.....	.....	.....	Cotton-seed meal.
5049	25.00	5.00	25.00	30.00	26.56	5.12	18.62	.....	.....	.....	Cotton-seed meal and hulls.
5343	17.00	3.00	40.00	30.00	18.81	4.07	27.16	.....	.....	.....	Cotton-seed hulls and meal.
5016	22.00	4.00	22.00	52.00	21.81	5.15	23.34	38.92	5.81	4.97	Cotton-seed meal and hulls.

MEALS AND HULLS.

Laboratory Number	Guarantee			Analysis							Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5134	26.67	10.62	23.82	26.37	21.13	9.23	27.63	28.13	4.74	9.14	Ground peanut cake.
5853	.....	.....	.....	.....	6.13	0.82	65.32	18.54	5.47	3.72	Peanut hulls.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3867	Old Process Oil Meal	American Linseed Co., New York, N. Y.	Job. P. Wyatt & Sons, Raleigh.	Jan. 2, '11	100

One sample of Linseed Meal was analyzed. This meets the guarantee in protein and fat, but is above the guarantee in fiber.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5090	Buffalo Gluten Feed	Corn Product Refining Co., New York, N. Y.	J. S. McEachern & Sons, Wilmington.	Mar. 15, '11	100
5336	do	do	do	July 15, '11	100
5335	Diamond Hog Meal	do	do	July 15, '11	100

Three samples of Gluten Feeds were analyzed. All came up to their guarantees.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3963	Cracked Corn	S. D. Scott & Co., Norfolk, Va.	C. B. Hill, New Bern	June 20, '11	100
5078	do	do	E. Peterson Grocery Co., Washington.	Mar. 14, '11	100
5106	do	do	Clark-Smith Co., Belhaven	Mar. 15, '11	100
5108	do	do	H. C. Privott, Edenton	Mar. 15, '11	100
5271	do	do	F. V. Johnson, Greenville	June 16, '11	100
5089	do	Virginia Mills, Suffolk, Va.	J. R. Bell, Morehead City	Mar. 14, '11	100
5277	do	do	R. B. Peters, Tarboro	June 15, '11	100
5286	do	do	Harrison Bros. Co., Williams- ton.	June 20, '11	100
5288	do	Mollett Grain Co., McClure, Ohio.	J. O. Everett, Plymouth	June 21, '11	100
5308	do	do	Eastern Grocery Co., Little- ton.	June 30, '11	100
5119	do	H. F. Munt, Petersburg, Va.	R. J. Madry, Scotland Neck	Mar. 20, '11	75

LINSEED MEAL.

Guarantee			Analysis								Microscopic Examination Shows the Following Ingredients
Laboratory Number	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3867	32.00	5.00	5.50	.....	38.69	6.51	7.75	.....	.....	.....	Linseed meal

GLUTEN FEEDS.

Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients	
Laboratory Number	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture			Ash
5090	25.00	2.50	8.50	.....	28.13	2.89	6.83	49.20	6.72	6.23	Gluten feed.
5336	23.00	2.50	8.50	.....	26.94	3.52	6.73	.....	.....	.....	do.
5335	18.00	8.00	10.00	.....	20.81	13.18	13.00	.....	.....	.....	Corn product and ground bone.

CRACKED CORN.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3963	9.00	4.00	4.00	-----	7.94	4.07	1.97	74.64	9.87	1.51	Cracked corn
5078	9.00	4.00	4.00	-----	8.75	3.33	1.69	73.76	8.48	3.99	do.
5106	9.00	4.00	4.00	-----	8.81	3.99	2.09	-----	-----	-----	do.
5108	9.00	4.00	4.00	-----	9.25	5.33	2.51	-----	-----	-----	do.
5271	-----	-----	-----	-----	9.44	4.15	1.84	-----	-----	-----	do.
5089	8.00	4.00	6.00	-----	8.25	3.55	1.99	-----	-----	-----	do.
5277	8.00	4.00	6.00	-----	9.38	3.77	1.87	-----	-----	-----	do.
5286	8.00	4.00	6.00	-----	8.94	3.88	1.82	-----	-----	-----	do.
5288	-----	-----	-----	-----	8.38	3.74	1.77	-----	-----	-----	do.
5308	-----	-----	-----	-----	10.25	4.35	1.60	-----	-----	-----	do.
5119	10.00	4.30	3.00	65.00	8.75	5.12	2.79	-----	-----	-----	do.

ANALYSES OF CRACK

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5285	Cracked Corn	H. F. Munt, Petersburg, Va.	J. L. Hassell & Co., Williams- ton.	June 20, '11	75
5274	do.	J. Havens, Washington, N. C.	W. S. Clark & Son, Tarboro.	June 15, '11	100
5278	do.	do.	Manufacturer	June 17, '11	100
5291	do.	Suffolk Feed and Fuel Co., Suf- folk, Va.	W. S. White, Edenton	June 21, '11	100
5289	do.	M. G. Brown, Edenton	Branning Mfg. Co., Edenton	June 21, '11	100
5284	do.	Toledo Grain and Milling Co., Toledo, Ohio.	J. L. Hassell & Co., Williams- ton.	June 20, '11	100
5264	do.	J. W. Poole & Son, Petersburg, Va.	Geo. S. Edwards Co., Rocky Mount.		100
5219	do.	Asheville Milling Co., Ashe- ville, N. C.	Byers Bros., Hendersonville	April 25, '11	100
5160	do.	Mayo Milling Co., Richmond, Va.	Royall Feed and Grocery Co., Littleton.	Mar. 31, '11	100
5333	do.	do.	R. T. Willis, Morehead City	July 13, '11	100
5146	do.	Bobbitt Grocery Co., Enfield, N. C.	W. G. Kimball, Enfield	Mar. 21, '11	100
5145	do.	B. D. Booth & Co., Petersburg, Va.	Bobbitt Grocery Co., Enfield	Mar. 21, '11	100
5110	do.	Washington Milling Co., Wash- ington Court House, Ohio.	J. B. Flora & Co., Elizabeth City.	Mar. 17, '11	100
5332	do.	do.	Roberts & Hurst, New Bern	July 12, '11	100
5080	do.	Virginia Mills Co., Norfolk, Va.	Plymouth Mercantile Co., Plymouth.	Mar. 14, '11	100
3969	do.	McNeil Milling Co., Fayette- ville, N. C.	Manufacturer		100
5125	do.	Boney & Harper, Wilmington	B. F. Mitchell, Wilmington	Mar. 18, '11	75
5127	do.	do.	A. W. King & Co., Wilming- ton.	Mar. 18, '11	75
5133	do.	do.	Brown-Toon Co., Wilming- ton.	Mar. 18, '11	75
5112	do.	W. S. White & Co., Elizabeth City, N. C.	Manufacturer	Mar. 17, '11	100
5105	do.	Ohio Cereal Co., Circleville, Ohio.	Carolina Distributing Co., Belhaven.	Mar. 15, '11	100
5102	do.	do.	The Stone Co., Wilmington	Mar. 16, '11	100
5295	do.	N. G. Grandy & Co., Elizabeth City, N. C.	Manufacturer	June 22, '11	100
5293	do.	Elizabeth City Milling Co., Elizabeth City, N. C.	Morgan & Parker, Elizabeth City.	June 22, '11	100
5085	do.	Churchill & Co., Kinston, N. C.	Manufacturer	Mar. 13, '11	100
5325	do.	do.	do.	July 7, '11	100
5330	do.	T. S. Southgate, Norfolk, Va.	Armstrong Grocery Co., New Bern	July 12, '11	100
5329	do.	J. A. Meadows, New Bern	Burrus & Co., New Bern	July 12, '11	100
5300	do.	Holland & Beaman, Suffolk, Va.	Fleetwood & Pruden, Jackson	June 29, '11	100

Forty samples of Cracked Corn were analyzed. Fourteen are below the guarantee in protein; nine are below the guarantee in fat, and three are above the guarantee in fiber.

ED CORN—Continued.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5285	10.00	4.30	3.00	65.00	8.38	3.93	1.40	.....	.....	.....	Cracked corn
5274	8.00	3.00	3.00	.....	9.00	3.51	1.76	.....	.....	.....	do.
5278	8.00	3.00	3.00	.....	8.13	4.17	1.82	.....	.....	.....	do.
5291	10.00	4.00	4.00	.....	8.06	3.77	1.79	.....	.....	.....	do.
5289	.....	.....	.....	.....	8.44	2.77	1.44	.....	.....	.....	do.
5284	.....	.....	.....	.....	8.75	2.92	1.64	.....	.....	.....	do.
5264	10.00	4.00	3.00	.....	9.06	4.36	2.03	.....	.....	.....	do.
5219	.....	.....	.....	.....	8.75	3.93	1.71	.....	.....	.....	do.
5160	10.37	2.85	1.52	.....	9.25	4.60	2.01	.....	.....	.....	do.
5333	10.37	2.85	1.52	.....	8.88	3.84	1.54	.....	.....	.....	do.
5146	.....	.....	.....	.....	9.94	4.13	2.20	.....	.....	.....	do.
5145	.....	.....	.....	.....	9.38	3.42	1.86	.....	.....	.....	do.
5110	8.97	4.15	3.00	60.00	8.94	4.05	2.46	.....	.....	.....	do.
5332	8.97	4.15	3.00	60.00	8.69	3.90	1.83	.....	.....	.....	do.
5080	8.00	4.00	6.00	.....	8.88	4.58	2.25	.....	.....	.....	do.
3969	.....	.....	.....	.....	8.38	4.03	2.28	.....	.....	.....	do.
5125	8.50	4.00	2.50	70.00	8.50	5.05	3.05	74.19	7.42	1.79	do.
5127	9.50	4.00	2.50	70.00	8.38	4.12	2.12	.....	.....	.....	do.
5133	9.50	4.00	2.50	70.00	8.31	3.94	2.09	.....	.....	.....	do.
5112	10.00	4.00	4.00	.....	7.56	4.94	2.56	.....	.....	.....	do.
5105	10.00	4.30	3.00	65.00	9.13	4.53	2.56	.....	.....	.....	do.
5102	10.00	4.30	3.00	65.00	9.88	3.95	2.16	.....	.....	.....	do.
5295	10.00	4.00	4.00	.....	9.00	4.87	2.09	.....	.....	.....	do.
5293	.....	.....	.....	.....	8.50	3.72	2.01	.....	.....	.....	do.
5085	8.50	3.50	3.00	70.00	9.44	5.72	3.25	.....	.....	.....	do.
5325	8.50	3.50	3.00	70.00	8.75	3.99	1.60	.....	.....	.....	do.
5330	.....	.....	.....	.....	9.13	4.32	1.88	.....	.....	.....	do.
5329	10.00	4.00	2.00	70.00	8.88	4.14	1.89	.....	.....	.....	do.
5300	10.00	4.00	4.00	.....	8.38	3.61	1.61	.....	.....	.....	do.

ANALYSES OF DIS

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5209	Queen Three D Grains.....	Dewey Bros. Co., Blanchester, Ohio.	City Feed Co., Hickory.	April 21, '11	100
5210	Corn Three D Grains.....	do.....	do.....	April 21, '11	100
5328	Queen Three D Grains.....	do.....	Burrus & Co., New Bern.	July 12, '11	100
5346	do.....	do.....	City Feed Co., Hickory.	Aug. 22, '11	90

Four samples of Distiller's Dried Grains were analyzed. Three are below the guarantee in protein and three are above the guarantee in fiber.

ANALYSES OF SPE

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5224	White Feed.....	Asheville Milling Co., Asheville, N. C.	H. J. Olive, Asheville.	April 25, '11	75
3854	do.....	do.....	Sent by Manufacturer.		
3855	Mileo.....	do.....	do.....		
5352	do.....	do.....	S. A. Engle, Asheville.	Aug. 25, '11	75
5202	Boss Feed.....	do.....	City Feed Co., Hickory.	April 21, '11	75
5253	do.....	do.....	C. J. Jeffries & Co., Canton.	May 16, '11	75
5035	C. S. C. Feed.....	Caner Supply Co., Baltimore, Md.	Geo. J. Hales & Bro., Rocky Mount.	Mar. 8, '11	100
5109	do.....	do.....	C. W. Stevens & Co., Elizabeth City.	Mar. 17, '11	100
5290	do.....	do.....	Branning Mfg. Co., Edenton.	June 21, '11	100
5020	Schumacher Stock Feed...	Quaker Oats Co., Chicago, Ill.	Scott-Sparger Co., Greensboro.	Feb. 20, '11	100
5275	Victor Feed.....	do.....	Tarboro Grocery Co., Tarboro.	June 15, '11	100
5155	Aeme Feed.....	Aeme-Evans Co., Indianapolis, Ind.	Littleton Feed and Grocery Co., Littleton.	Mar. 30, '11	100
5263	do.....	do.....	Tomlinson & Co., Wilson.	June 12, '11	100
5222	Butter Fat Middlings.....	Grain Products Co., Dyersburg, Tenn.	Overman & Co., Salisbury.	April 27, '11	100
5227	do.....	do.....	do.....	May 3, '11	100
5299	White Cross Horse Feed...	Albert Dickinson Co., Chicago, Ill.	Fleetwood & Pruden, Jackson	June 29, '11	100
5229	Xtragood Feed.....	White Pine Mill Co., White Pine, Tenn.	M. Hyams, Asheville.	April 26, '11	75
5197	Aeme Feed.....	Aeme Milling Co., Talbot, Tenn.	Wampum Department Store, Lincoln	April 20, '11	75
5283	Boss Feed.....	Great Western Cereal Co., Chicago, Ill.	Blount & Bro., Williamston.	June 20, '11	....
3890	Peerless Feed.....	J. Allen Smith & Co., Knoxville, Tenn.	A. E. Rankin & Co., Fayetteville.	June 6, '11	100
3901	do.....	do.....	Adams Grain and Provision Co., Fayetteville	Jan. 6, '11	100

THILLER'S DRIED GRAINS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5209	18.26	4.90	8.15	35.45	16.25	8.30	17.43	.....	.....	.....	Distiller's dried grains—rye.
5210	26.33	9.14	8.13	30.40	27.41	11.10	13.04	.....	.....	.....	Distiller's dried grains—corn.
5328	18.00	4.00	15.00	35.00	17.75	9.42	12.66	.....	.....	.....	Distiller's dried grains—rye.
5316	18.00	4.00	15.00	.....	14.25	4.67	19.94	.....	.....	.....	do.

CIAL MIXED FEEDS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5221	13.00	3.00	4.00	70.00	12.50	4.32	2.52	.....	.....	.....	Wheat and corn product.
3854	.....	.....	.....	.....	15.69	3.43	3.45	64.19	10.07	3.17	Wheat product.
3855	.....	.....	.....	.....	15.38	3.84	7.17	59.30	8.96	5.25	do.
5352	15.38	3.84	7.17	66.47	11.56	4.45	4.30	.....	.....	.....	Wheat and corn product.
5202	14.00	3.00	7.00	65.00	13.06	3.89	6.70	.....	.....	.....	do.
5253	14.00	3.00	7.00	65.00	14.69	4.23	6.84	.....	.....	.....	do.
5035	10.00	4.00	7.00	60.00	10.50	4.99	5.77	.....	.....	.....	Cracked corn, oats, barley, small amount wheat bran.
5109	10.00	4.00	7.00	60.00	10.63	4.51	5.61	.....	.....	.....	do.
5290	10.00	4.00	7.00	60.00	10.88	2.46	3.46	.....	.....	.....	Cracked corn, rolled oats and barley.
5020	10.00	4.00	9.00	62.00	11.25	5.16	8.96	63.49	7.01	4.13	Oat product, wheat product, corn pro- duct, cotton-seed meal.
5275	10.00	4.00	9.00	62.00	10.38	4.20	6.66	.....	.....	.....	Oat product, cracked corn, cotton-seed meal, wheat product
5155	16.50	4.00	8.00	54.00	17.00	4.51	7.95	.....	.....	.....	Wheat product.
5263	10.00	4.00	.....	54.00	16.00	4.90	7.54	.....	.....	.....	do.
5222	14.00	5.00	10.00	60.00	11.75	3.79	7.27	.....	.....	.....	Wheat and corn product.
5227	14.00	5.00	10.00	60.00	11.88	3.51	7.75	.....	.....	.....	do.
5299	10.00	2.50	8.00	60.00	10.31	3.77	4.65	.....	.....	.....	Cracked corn, rolled oats and barley.
5229	14.50	4.00	10.00	50.00	12.88	4.09	4.25	.....	.....	.....	Wheat and corn product.
5197	12.94	5.70	7.39	59.21	14.44	4.92	7.57	.....	.....	.....	Wheat product and corn bran.
5283	10.00	4.00	9.09	60.00	10.44	3.24	6.36	.....	.....	.....	Oat product, cracked corn, small amount cotton-seed meal.
3890	15.00	4.00	7.00	58.00	15.00	4.34	6.71	.....	.....	.....	Wheat and corn product.
3901	15.00	4.00	7.00	58.00	14.44	3.77	7.20	61.24	8.79	4.56	Wheat and corn product—corn bran.

ANALYSES OF SPECIAL

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3910	Peerless Feed	J. Allen Smith & Co., Knoxville, Tenn.	A. W. Porter & Co., Rockingham.	Jan. 9, '11	100
3983	do.	do.	E. H. Lawrence & Co., Durham.	Feb. 7, '11	100
5097	do.	do.	J. W. Brooks, Wilmington.	Mar. 16, '11	100
3924	Famous Feed	Corydon Milling Co., Corydon, Ky.	Johnson Bros. Charlotte.	Jan. 12, '11	75
3925	do.	do.	Charles Moody Co., Charlotte.	Jan. 12, '11	75
5185	do.	do.	F. D. Barkley & Co., Gastonia.	April 19, '11	75
5212	do.	do.	Morrison Provision Co., Hickory.	April 21, '11	75
3871	Fine Feed or Feed Meal	Mountain City Mill Co., Chattanooga, Tenn.	L. H. Adams, Raleigh.	Jan. 3, '11	100
5130	do.	do.	S. P. McNair & Co., Wilmington.	Mar. 18, '11	100
5170	do.	do.	M. L. Milliken Co., Hamlet.	April 6, '11	100
3920	Rich Middlings	Model Mills Co., Johnson City, Tenn.	Adams Grain and Provision Co., Charlotte.	Jan. 12, '11	75
5196	do.	do.	W. J. Arey, Shelby.	April 20, '11	75
5339	Model Mill Feed	do.	J. W. Carter, Maxton.	July 18, '11	100
3850	Bull's Eye Mixed Feed	Blish Milling Co., Seymour, Ind.	Caldwell & Carlyle, Lumberton.		
3922	do.	do.	Adams Grain and Provision Co., Charlotte.	Jan. 12, '11	75
5021	do.	do.	McLaughlin Co., Raeford.	Feb. 22, '11	100
5092	do.	do.	J. S. McEachern & Sons, Wilmington.	Mar. 15, '11	100
5142	do.	do.	Hall & Pearsall, Wilmington.	Mar. 21, '11	100
5205	Cracker Jack Mixed Feed	Lewis & Adeock, Knoxville, Tenn.	City Feed Co., Hickory.	April 21, '11	75
5210	True Tag Mixed Feeds	do.	Asheville Grocery Co., Asheville.	April 24, '11	100
5255	Cremo Cow Chops	Huff & Cook, Roanoke, Va.	City Grocery Co., Madison.	May 29, '11	100
5251	Kyome Feed	J. E. M. Milling Co., Frankfort, Ky.	E. L. Kiser & Co., Rural Hall.	May 10, '11	100
5245	Germo	Just Milling and Feed Co., Nashville, Tenn.	Elkin Roller Mill, Elkin.	May 9, '11	100
5191	Banner Mill Feed	Banner Roller Mills, Lincoln-ton	L. J. Dellinger & Co., Lincoln-ton.	April 20, '11	75
5050	Roller King Feed	Robert Brackett, High Point, N. C.	H. L. Parks & Co., Concord.	Mar. 8, '11	75
3931	Red Ribbon Mill Feed	Rives-Rucker Grocery Co., Martinsville, Va.	P. R. Lamb & Co., Winston.	Jan. .., '11	100
3923	Invincible Feed	Hopkinsville Milling Co., Hopkinsville, Ky.	Herbert Irwin, Charlotte.	Jan. 12, '11	75
3915	Sell Me Feed	Fork Milling Co., Mocksville, N. C.	Sent by Manufacturer.		
3857	Special Hog Feed	J. W. Isler & Co., Goldsboro, N. C.	do.		
3843	Hereulean Mash Feed	F. B. Phillips, Raleigh, N. C.	do.		
3814	Hereulean Horse Feed	do.	do.		
3831	Butter Milk Dairy Feed	Cooper Riddick Co., Suffolk, Va.	do.		
5310	Nonesuch Feed	Louisville Cereal Mill Co., Louisville, Ky.	Lewis & Joyner, Henderson.	July 5, '11	100
5351	Best Feed	Leicester Roller Mills, Leicester, N. C.	S. A. Engle, Asheville.	Aug. 25, '11	75

Fifty-five samples of Special Mixed Feeds were analyzed. Fifteen are below the guarantee in protein; eight are below the guarantee in fat, and six are above the guarantee in fiber.

MIXED FEEDS—Continued.

Laboratory Number	Guarantee				Analysis						Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3910	15.00	4.00	7.00	58.00	15.25	4.52	6.90	.....	.....	.....	Wheat and corn product—corn bran.
3983	15.00	4.00	7.00	58.00	15.06	3.85	6.45	.....	.....	.....	do.
5097	15.00	4.00	7.00	58.00	13.50	3.47	5.00	.....	.....	.....	do.
3924	14.00	4.50	9.50	50.00	11.06	4.75	4.77	.....	.....	.....	Wheat product and corn bran
3925	14.00	4.50	9.50	50.00	10.25	4.80	3.12	.....	.....	.....	do.
5185	14.00	4.50	9.50	50.00	11.81	4.56	3.30	.....	.....	.....	Wheat and corn product.
5212	14.00	4.50	9.50	50.00	9.75	4.55	3.33	.....	.....	.....	do.
3871	12.50	5.50	8.50	.....	12.88	5.91	5.34	.....	.....	.....	Wheat and corn product—corn bran.
5130	12.50	5.50	8.50	60.00	13.00	6.05	4.09	.....	.....	.....	Wheat and corn product.
5170	12.50	5.50	8.50	60.00	14.50	5.44	4.95	.....	.....	.....	do.
3920	15.20	4.40	4.50	67.40	15.63	4.27	6.87	.....	.....	.....	do.
5196	16.00	4.80	4.50	67.40	16.63	5.10	5.60	.....	.....	.....	do.
5339	14.72	4.80	7.15	55.00	16.13	4.49	6.62	.....	.....	.....	do.
3850	.....	.....	.....	.....	16.38	4.77	8.13	57.74	6.95	6.03	Wheat product.
3922	16.00	4.50	9.10	.....	16.63	4.82	7.80	.....	.....	.....	do.
5021	16.00	4.50	9.10	.....	16.63	4.85	7.40	.....	.....	.....	do.
5092	16.00	4.50	9.10	.....	16.63	4.46	7.43	.....	.....	.....	do.
5142	16.00	4.50	9.10	.....	16.38	4.44	7.94	.....	.....	.....	do.
5205	10.00	4.00	10.00	45.00	10.38	4.82	7.40	.....	.....	.....	Wheat and corn products—corn bran.
5216	9.00	4.00	8.00	50.00	10.50	4.97	3.40	.....	.....	.....	Cracked corn, rolled oats.
5255	18.00	4.50	4.30	.....	17.88	4.40	3.86	.....	.....	.....	Corn product, gluten feed, cotton-seed meal.
5251	15.50	3.34	6.56	59.98	15.94	4.25	5.86	.....	.....	.....	Wheat and corn product.
5245	9.00	3.75	2.00	68.00	8.38	4.20	3.61	.....	.....	.....	Corn product.
5199	12.00	4.00	10.00	60.00	16.50	4.29	10.58	.....	.....	.....	Wheat and corn product.
5056	16.50	4.26	5.94	.....	16.25	5.32	6.00	.....	.....	.....	Wheat product.
3939	11.16	3.60	4.60	67.22	13.75	4.76	8.70	.....	.....	.....	Wheat product and corn bran.
3925	15.40	4.30	9.00	60.24	15.75	4.79	8.01	.....	.....	.....	Wheat product.
3915	.....	.....	.....	.....	10.50	3.72	3.10	.....	.....	.....	Wheat and corn product.
3857	.....	.....	.....	.....	11.19	4.50	4.65	66.56	10.26	2.84	do.
3843	.....	.....	.....	.....	17.88	4.73	6.85	52.95	9.45	8.14	.....
3844	.....	.....	.....	.....	11.00	4.11	7.28	64.12	9.42	4.07	.....
3839	.....	.....	.....	.....	12.88	4.04	11.25	.....	.....	.....	.....
5310	11.62	7.80	6.50	60.00	11.63	8.28	5.09	.....	.....	.....	Wheat and corn product.
5351	14.50	4.00	9.50	.....	14.94	4.94	5.91	.....	.....	.....	Wheat product.

ANALYSES OF

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—lbs.
3860	Corno Hen Feed.	The Corno Mills Co., St. Louis, Mo.	Phillips & Penny, Raleigh	Jan. 2, '11	100
5088	do.	do.	J. R. Bell, Morehead City	Mar. 14, '11	100
5148	do.	do.	J. T. Wood, Enfield	Mar. 21, '11	100
5077	Corno Chick Feed	do.	F. V. Johnson, Greenville	Mar. 10, '11	100
3914	Scratch Feed	Ralston Purina Co., St. Louis, Mo.	Baldwin Grocery Co., Rock- ingham.	Jan. 9, '11	100
3957	Poultry Feed	do.	C. L. Spencer, New Bern	Jan. 20, '11	100
3990	do.	do.	Southern Pure Food Co., Durham.	Feb. 7, '11	100
5029	do.	do.	C. Woodard Co., Wilson	Mar. 7, '11	100
3906	do.	do.	Covington & Hammond, Laurinburg.	Jan. 7, '11	100
5070	Chicken Feed	do.	Hub Grocery Co., Tarboro	Mar. 9, '11	100
5073	do.	do.	J. L. Starkey & Co., Green- ville.	Mar. 10, '11	100
3926	Purina Mill Feed— Scratch Size	do.	Charles Moody Co., Charlotte	Jan. 12, '11	100
5269	Chicken Chowder	do.	J. R. & J. G. Moye, Greenville	Jan. 16, '11	100
5317	do.	do.	Southern Feed and Grocery Co., Durham.	July 6, '11	100
5270	Wood's Poultry Grain Food.	T. W. Wood & Son, Richmond, Va.	F. V. Johnson, Greenville	Jan. 16, '11	100
5343	do.	do.	W. M. Sanders, Smithfield	July 19, '11	100
3868	Crescent Chick Feed.	Albert Dickinson Co., Chicago, Ill.	Job P. Wyatt & Sons, Raleigh	Jan. 2, '11	100
3869	Globe Scratch Feed.	do.	do.	Jan. 2, '11	100
5095	do.	do.	J. S. McEachern & Sons, Wil- mington.	Mar. 15, '11	100
3923	Pine Tree Scratch Feed	do.	Adams Grain and Provision Co., Charlotte.	June 12, '11	100
5096	Colonial Developing Feed	do.	J. S. McEachern & Sons, Wil- mington.	Mar. 15, '11	100
5191	Kluk Poultry Feed— Chick Size	Kornfalfa Feed Milling Co., Kansas City, Mo.	J. Flem Johnson Co., Gas- tonia.	April 19, '11	100
5306	Kluk Poultry Feed	do.	J. F. Newsom & Son, Little- ton.	June 30, '11	100
5282	Baby Chic Food	S. T. Beveridge & Co., Rich- mond, Va.	J. R. Bunting, Bethel	June 20, '11	100
5320	Star Brand Chicken Feed	do.	H. A. Powell Grocery Co., Richmond, Va.	July 11, '11	100
5258	Red Ribbon Chick Food	Park & Pollard Co., Boston, Mass.	C. Woodard & Co., Wilson	June 12, '11	100
5023	Chicken Feed	Hinshaw Roller Mills, Saxapa- haw, N. C.	Sent by Manufacturer		
3927	Success Scratch Feed	Robinson-Danforth Co., St. Louis, Mo.	Charles Moody Co., Charlotte	Jan. 12, '11	100
3908	Laying Food	J. H. Wilkes & Co., Nashville, Tenn.	A. W. Porter & Co., Rock- ingham.	Jan. 9, '11	100
5347	Scratch Food	do.	City Feed Co., Hickory	Aug. 22, '11	100
3896	Blue Hen Chicken Feed	Statesville Flour Mill Co., Statesville, N. C.	Adams Grain and Provision Co., Fayetteville.	Jan. 6, '11	100
5338	do.	do.	J. H. Wishart, Lumberton	July 17, '11	50
5180	Red Comb Meat Mash	Edwards & Loomis Co., Chi- cago, Ill.	Thompson Grain and Feed Store, Salisbury.	April 11, '11	50

POULTRY FEEDS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients				
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash					
3860	10.00	3.70	2.30	.....	12.25	3.40	2.57	.....	.....	.....	Wheat, kaffir corn, oats, sunflower seed, cracked corn.				
5088	10.00	3.50	5.00	68.00	10.00	3.90	3.12	.....	.....	.....	Cracked corn, wheat, barley, oats, kaffir corn, sunflower seed.				
5148	10.00	3.50	5.00	68.00	10.19	3.64	2.10	.....	.....	.....	Cracked corn, wheat, kaffir corn, sunflower seed.				
5077	10.75	2.75	3.00	68.00	9.69	2.41	2.28	75.66	7.84	2.12	Cracked corn, wheat, kaffir corn, millet seed.				
3914	11.00	3.60	4.00	65.00	11.50	3.67	3.19	.....	.....	.....	Cracked corn, wheat, barley, kaffir corn, buckwheat, sunflower seed.				
3957	11.00	3.60	4.00	65.00	11.88	3.76	3.70	.....	.....	.....	Wheat, cracked corn, barley, oats, sunflower seed, kaffir corn.				
3990	11.00	3.60	4.00	65.00	11.44	4.21	3.50	.....	.....	.....	Wheat, cracked corn, oats, barley, kaffir corn.				
5029	11.00	3.60	4.00	65.00	10.94	4.11	2.91	71.91	8.25	1.88	Cracked corn, wheat, barley, kaffir corn, buckwheat.				
3906	11.00	3.60	4.00	65.00	11.25	3.29	3.39	71.83	8.10	2.14	Wheat, cracked corn, kaffir corn, barley, buckwheat, sunflower seed.				
5070	11.00	3.60	4.00	65.00	11.69	3.53	3.16	.....	.....	.....	Cracked corn, cracked kaffir corn, millet seed, flax seed, wheat.				
5073	11.00	3.60	4.00	65.00	12.13	3.52	2.51	.....	.....	.....	Cracked corn, cracked kaffir corn, millet seed, wheat.				
3926	10.00	3.60	4.00	65.00	11.81	3.59	3.23	.....	.....	.....	Wheat, cracked corn, barley, kaffir corn, buckwheat, sunflower seed.				
5269	16.00	2.50	9.00	56.00	17.31	4.03	7.31	.....	.....	.....	Wheat bran and middlings, corn meal, alfalfa meal, linseed meal, ground meat, charcoal.				
5317	16.00	2.50	9.00	56.00	17.88	3.62	8.29	.....	.....	.....	do.				
5270	11.50	3.00	4.50	.....	10.75	4.03	2.44	.....	.....	.....	Cracked corn, wheat, buckwheat, barley, kaffir corn.				
5343	11.50	3.00	4.50	.....	11.44	3.57	3.21	.....	.....	.....	Cracked corn, buckwheat, kaffir corn, wheat, barley, millet seed.				
3868	10.00	2.50	5.00	60.00	10.19	3.19	3.09	.....	.....	.....	Cracked corn, kaffir corn, wheat, millet seed, ground limestone.				
3869	10.00	2.50	5.00	60.00	11.13	4.15	3.69	.....	.....	.....	Oats, wheat, barley, sunflower seed, kaffir corn, buckwheat, cracked corn, ground limestone.				
5095	10.00	2.50	5.00	60.00	12.00	3.91	3.76	.....	.....	.....	Cracked corn, wheat, kaffir corn, buckwheat, barley, sunflower seed.				
3923	10.00	2.50	5.00	60.00	11.63	3.80	3.13	.....	.....	.....	Wheat, cracked corn, oats, barley, kaffir corn, sunflower seed.				
5096	10.00	2.50	5.00	60.00	10.63	2.90	2.72	.....	.....	.....	Cracked corn, wheat, millet seed, kaffir corn, buckwheat, grit.				
5191	9.50	3.50	4.00	65.00	10.00	2.91	2.79	74.54	7.65	2.11	Cracked corn, kaffir corn, millet seed.				
5306	10.00	3.25	4.50	60.00	10.63	2.85	1.27	.....	.....	.....	Cracked corn, buckwheat, kaffir corn, wheat.				
5282	10.00	2.50	5.00	60.00	10.00	3.53	2.40	.....	.....	.....	Cracked corn, wheat, kaffir corn, millet seed.				
5320	10.00	3.00	9.00	50.00	11.94	2.86	3.13	.....	.....	.....	Cracked corn, wheat, oats, buckwheat, kaffir corn.				
5258	10.00	3.00	.....	.....	11.13	3.77	2.39	.....	.....	.....	Cracked corn, wheat, millet seed, cracked kaffir corn.				
5023	.....	.....	.....	.....	9.25	4.05	3.27	.....	.....	.....	Cracked corn, wheat, oats.				
3927	10.00	3.60	6.00	60.00	11.06	4.85	3.85	.....	.....	.....	Wheat, cracked corn, oats, barley, kaffir corn, buckwheat, screenings.				
3908	10.50	3.56	3.15	73.31	11.50	3.40	2.57	.....	.....	.....	Wheat, cracked corn, oats, kaffir corn.				
5347	10.06	3.48	3.46	.....	10.06	3.72	2.78	.....	.....	.....	Cracked corn, kaffir corn, wheat, oats, sunflower seed.				
3896	10.00	3.00	2.00	60.00	10.19	3.20	2.18	.....	.....	.....	Wheat, cracked corn, sunflower seed.				
5338	10.00	3.00	2.00	60.00	10.00	4.07	1.77	.....	.....	.....	Cracked corn, wheat, screenings.				
5180	15.00	4.00	8.00	45.00	17.50	5.59	8.18	53.94	6.96	7.83	Alfalfa meal, oat product, corn meal, oil meal, beef scraps, wheat bran, small amount ground oyster shells, charcoal.				

ANALYSES OF POUL

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5181	Darling's Blood Meal.....	Van Iderstine Co., Long Island City, N. Y.	Thompson Grain and Feed Store, Salisbury.	April 11, '11	100
5319	Rarva Meat Meal.....	Richmond Abbatoir, Richmond, Va.	T. M. Stephenson & Co., Durham.	July 6, '11	100
5334	Scratch Feed.....	Carter, Venable Co., Richmond, Va.	J. D. Lee, Jacksonville.....	July 7, '11	100
5312	Blue Diamond Scratch Feed.	Baltic Mills, Vincennes, Ind....	L. Thomas, Oxford.....	July 6, '11	100

Thirty-seven samples of Chicken Feeds were analyzed. Three are below the guarantee in protein; six are below the guarantee in fat, and three are above the guarantee in fiber.

ANALYSES OF MISCEL

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
3398	Mixed Feed.....	Douthat-Riddle Co., Danville, Va.	Currie & Patterson, Maxton.	Jan. 7, '11	100
3905	do.....	do.....	J. W. Carter, Maxton.....	Jan. 7, '11	100
3980	do.....	do.....	E. H. Lawrence & Co., Durham.	Feb. 7, '11	100
5061	do.....	do.....	Charles Moody Co., Charlotte.	Mar. 9, '11	75
5176	do.....	do.....	J. H. Monger, Sanford.....	April 7, '11	100
5192	do.....	do.....	J. Flem. Johnson Co., Gastonia.	April 19, '11	100
3883	Wheat Feed.....	Atlanta Milling Co., Atlanta, Ga.	W. A. Myatt, Raleigh.....	Jan. 3, '11	100
3893	do.....	do.....	Adams Grain and Provision Co., Fayetteville.	Jan. 6, '11	75
5238	do.....	do.....	Job P. Wyatt & Sons, Raleigh	May 23, '11	100
5252	do.....	do.....	Miller-Wolff Co., Rural Hall.	May 10, '11	100
5340	Mill Feed.....	do.....	J. W. Carter, Maxton.....	July 18, '11	...
5228	do.....	Statesville Flour Mill Co., Statesville, N. C.	Herbert Irwin, Charlotte.....	May 3, '11	75
5256	Feed.....	do.....	Sent by manufacturer.....		
3835	Corn Product.....	J. A. Meadows, New Bern.	do.....		
3953	Cow Feed.....	do.....	Manufacturer.....	Jan. 20, '11	100
3955	Horse Feed.....	do.....	do.....	Jan. 20, '11	100
5081	do.....	do.....	Churchill & Co., Kinston.....	Mar. 13, '11	100
5326	do.....	do.....	do.....	July .., '11	100
5292	Feed.....	Ward & Co., Thomasville, N. C.	Sent by manufacturer.....		
2266	Wheat Screenings.....	Ballard & Ballard, Louisville, Ky	Matthews, Weeks & Co., Rocky Mount	June 13, '11	100

TRY FEEDS—*Continued.*

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5181	80.00				85.75	0.19	0.56				Dried blood.
5319	85.00	7.00			79.50	7.66	0.11				Meat meal.
5334	10.00	2.50	5.00	60.00	10.00	3.43	2.33				Cracked corn, wheat, kaffir corn, barley, sunflower seed.
5312	11.00	5.00	3.50	65.00	10.56	3.33	2.95				Cracked corn, wheat, barley, kaffir corn, buckwheat, sunflower seed.

LANEOUS MIXED FEEDS.

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
3898	10.40	4.50	10.00		8.81	3.26	9.78				Wheat and corn product—cob and grain.
3905	10.40	4.30	10.00		9.38	3.32	7.75	68.57	7.99	2.99	do.
3980	10.40	4.30	10.00		9.31	4.02	8.08				do.
5061	10.40	4.50	10.00		8.25	3.26	8.68				do.
5176	10.40	4.30	10.00		9.06	3.56	7.99	69.18	7.82	2.39	do.
5192	10.40	4.30	10.00		8.31	3.46	8.40				do.
3883	15.00	4.00	8.00		15.19	4.16	6.33				Wheat product.
3893	15.00	4.00	8.00	58.00	15.63	4.08	5.96				do.
5238	15.00	4.00	8.00		15.00	4.39	6.04				do.
5252	15.00	4.00	8.00	58.00	14.63	4.08	5.61				do.
5340	13.00	4.00	9.50	58.62	14.50	4.43	6.18				Wheat and corn product.
5228	15.50	4.00	7.00	60.00	13.88	4.68	6.38				do.
5256					13.31	4.06	4.29				do.
3835					8.25	2.52	1.51	61.36	12.15	14.21	Corn product.
3953	22.00	5.75	5.50		16.75	4.48	11.05				Wheat bran, corn product, cotton-seed meal.
3955	11.00	4.00	4.50		9.38	3.82	4.75				Wheat bran, corn product, oats.
5081	11.00	4.00	4.50		9.00	4.35	4.63				do.
5326	10.00	4.00	4.50		9.25	3.25	4.66				do.
5292					10.38	3.28	3.08				Wheat and corn product
5266	12.50	3.00	5.00		13.75	2.58	4.55				Wheat screenings.

ANALYSES OF MISCELLANE

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Date of Collection	Claimed Weight of Package—Lbs.
5237	Feed.....	W. H. Turner, Winston, N. C.	Sent by manufacturer.....		
3976	do.....	Hickory Milling Co., Hickory,	do.....		
5053	Mixed Feed.....	Concord Milling Co., Concord, N. C.	H. M. Blackwelder, Concord	Mar. 8, '11	100
5184	Mill Feed.....	F. D. Barkley & Co., Gastonia, N. C.	Manufacturer.....	April 19, '11	75
3921	Mixed Feed.....	Newport Mill Co., Loudon, Tenn.	Adams Grain and Provision Co., Charlotte	Jan. 12, '11	75
5047	do.....	do.....	Max Moses & Co., Salisbury	Mar. 8, '11	75
5187	do.....	do.....	F. D. Barkley & Co., Gas-tonia.	April 19, '11	75
3930	Mill Feed.....	Horn-Johnstone Co., Mocksville, N. C.	Davidson & Wolff, Charlotte	Jan. 12, '11	75
5062	do.....	do.....	do.....	Mar. 9, '11	75
5183	do.....	do.....	W. M. Neal & Co., Mooresville.	April 18, '11	100
5174	do.....	J. M. McIver, Gulf, N. C.	J. H. Monger, Sanford	April 7, '11	100
5022	Feed.....	C. D. Crouch & Sons, Elmwood, N. C.	Sent by manufacturer.....		
3974	do.....	Maiden Milling Co., Maiden, N. C.	do.....		
3971	Feed Meal.....	McNeil Milling Co., Fayetteville, N. C.	Manufacturer.....	Jan. 28, '11	100
3912	Mill Feed.....	Waynesboro Milling Co., Waynesboro, Va.	H. W. Little & Co., Wadesboro	Jan. 10, '11	100
3856	Feed.....	Blanton Roller Mills, Shelby, N. C.	Sent by manufacturer.....		
3852	do.....	Davidson Roller Mills, Lexington, N. C.	do.....		
3836	do.....	A. Miller, La Grange, N. C.	do.....		
3838	Mill Feed.....	Foil Bros., Mt. Pleasant, N. C.	do.....		
3842	Mash Feed.....	J. S. McEachern & Sons, Wilmington, N. C.	do.....		
3846	Mill Feed.....	High Point Milling Co., High Point, N. C.	Manufacturer.....	Nov. 2, '10	100
5345	do.....	Gulf Roller Mills, Gulf, N. C.	Sent by manufacturer.....		
5395	Mixed Feed.....	Austin Heaton Co., Durham, N. C.	J. F. Newsom & Son, Littleton.	June 30, '11	100

Forty-three samples of Miscellaneous Mixed Feeds were analyzed. Twenty are below the guarantee in protein; nine are below the guarantee in fat, and seven are above the guarantee in fiber.

OUS MIXED FEEDS—*Continued.*

Laboratory Number	Guarantee					Analysis					Microscopic Examination Shows the Following Ingredients
	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Carbo- hydrates	Protein (N x 6.25)	Fat (Ether Extract)	Fiber	Nitrogen-free Extract	Moisture	Ash	
5237					21.19	4.78	5.09				Corn meal, cotton-seed meal, gluten feed.
3976					10.13	4.44	3.91				Wheat and corn product.
5053	14.00	3.50	8.00		12.63	4.57	6.33				do.
5184	12.00	4.00	6.00		11.06	3.70	3.58				do.
3921	13.50	4.00	8.00		13.63	5.05	7.77				Wheat product and corn bran.
5047	13.50	4.00	8.00		14.50	5.74	6.63				do.
5187	13.50	4.00	8.00		15.69	4.67	6.76				do.
3930	13.75	3.00	6.25	73.00	12.38	4.09	7.24				Wheat and corn product
5062	13.75	3.00	6.25	73.00	13.50	3.86	7.89				do.
5183	13.75	3.00	6.25	73.00	12.75	4.20	6.90				do.
5174	17.50	4.50	6.00		15.81	4.57	6.77				Wheat product.
5022					16.50	5.07	7.35				do.
3974					5.69	2.12	16.98				Wheat product and corn cobs.
3971					10.44	4.62	5.96				Wheat, corn and oat product.
3912	14.00	4.00	9.00		15.81	4.48	7.44				Wheat product.
3856					15.19	3.61	3.26	66.53	9.00	2.41	do.
3852					12.13	3.13	5.33	69.43	6.91	3.07	Wheat and corn bran.
3836					9.50	6.41	9.45	53.21	9.23	12.20	
3838					14.00	3.00	3.58				
3842					14.38	4.14	8.71	44.22	6.98	21.57	
3846	10.00	3.50	5.00		9.63	4.05	3.37				
5345					15.94	4.36	5.92				Wheat product.
5305	16.00	4.50	5.50		15.13	4.47	6.30				Wheat and corn product.

MICROSCOPIC ANALYSES OF FEEDS

Laboratory Number	Brand Name from Label		Manufacturer or Wholesaler	
583 M	Corn Chops.....		Boney & Harper, Wilmington, N. C.....	
584 M	Bull's Eye Mixed Feed		Blish Milling Co., Seymour, Ind.....	
585 M	Shipstuff.....		Dunlap Mills, Richmond, Va.....	
586 M	....do.....		Ballard & Ballard Co., Louisville, Ky.....	
587 M	....do.....		Dunlap Mills, Richmond, Va.....	
588 M	....do.....		Statesville Flour Mills Co., Statesville, N. C.....	
589 M	....do.....		....do.....	
590 M	....do.....		....do.....	
591 M	....do.....		....do.....	
592 M	Pecrless Feed.....		J. Allen Smith & Co., Knoxville, Tenn.....	
593 M	....do.....		....do.....	
594 M	Hominy Feed.....		Liberty Mills, Nashville, Tenn.....	
595 M	Acme Feed.....		Acme Milling Co., Talbot, Tenn.....	
596 M	Wheat Bran.....		Liberty Mills, Nashville, Tenn.....	
597 M	Fine Feed or Feed Meal		Mountain City Mill Co., Chattanooga, Tenn.....	
598 M	Wheat Bran.....		Tennessee Mill Co., Estill Springs, Tenn.....	
599 M	Cracked Corn.....		H. F. Munt, Petersburg, Va.....	
600 M	Wheat Bran.....		Dan Valley Mills, Danville, Va.....	
601 M	....do.....		White Star Mills, Staunton, Va.....	
602 M	Mixed Feed.....		Douthat-Riddle Co., Danville, Va.....	
603 M	Cracked Corn.....		The Virginia Mills, Suffolk, Va.....	
604 M	....do.....		T. R. Southgate, Norfolk, Va.....	
605 M	....do.....		J. R. McEachern & Sons, Wilmington, N. C.....	
606 M	....do.....		Dabney Brokerage Co., Newport News, Va.....	
607 M	....do.....		S. D. Scott & Co., Norfolk, Va.....	
608 M	Brown Middlings.....		C. A. Gambrill Mfg. Co., Baltimore, Md.....	
609 M	Shipstuff.....		Austin-Heaton Co., Durham, N. C.....	
610 M	....do.....		....do.....	
611 M	Mixed Feed.....		....do.....	

NOT ANALYZED CHEMICALLY.

Laboratory Number	Retail Dealer	Microscopic Examination Shows the Following Ingredients
583 M	Brown-Toon Co., Wilmington	Corn chops.
584 M	Caldwell & Carlyle, Lumberton.....	Wheat product
585 M	.....do.....	do.
586 M	C. V. Williams & Co., Hamlet.....	do.
587 M	Stanly Supply Co., Albemarle.....	do.
588 M	M. F. Little & Co., Albemarle.....	Wheat product adulterated with corn bran.
589 M	Asheville Grain and Hay Co., Asheville.....	do.
590 M	Asheville Grocery Co., Asheville.....	Wheat product.
591 M	Albemarle Grocery Co., Albemarle.....	Wheat product adulterated with corn bran.
592 M	Morrow Bros. & Heath Co., Albemarle.....	Wheat and corn product.
593 M	F. D. Forester & Co., North Wilkesboro.....	do.
594 M	Marion Grain and Provision Co., Marion.....	Corn product.
595 M	Byers Bros., Hendersonville.....	Wheat and corn product.
596 M	H. J. Olive, Asheville.....	Wheat bran.
597 M	Asheville Grain and Hay Co., Asheville.....	Wheat and corn products.
598 M	Elkin Roller Mills, Elkin.....	Wheat bran.
599 M	Littleton Feed and Grocery Co., Littleton.....	Cracked corn.
600 M	E. G. Davis Sons Co., Henderson.....	Wheat bran.
601 M	Southern Grocery Co., Henderson.....	do.
602 M	Horner Bros., & Co., Oxford.....	Wheat and corn product—cob and grain.
603 M	H. C. Edwards, Kinston.....	Cracked corn and small amount of cob.
604 M	J. T. Davenport, Morehead City.....	Cracked corn.
605 M	Manufacturer.....	do.
606 M	McNair & Pearsall, Wilmington.....	do.
607 M	Stone & Co., Wilmington.....	Cracked corn and small amount of cob.
608 M	Monaghan & Co., Fayetteville.....	Wheat middlings.
609 M	J. H. Monger, Sanford.....	Wheat product adulterated with corn bran.
610 M	Wilkins-Ricks Co., Sanford.....	do.
611 M	L. C. Wooten, Fayetteville.....	Wheat and corn product.

CONDIMENTAL FEEDS, STOCK AND POULTRY TONICS AND CONDITIONERS.

The law regulating the sale of condimental feeds, stock and poultry tonics and conditioners went into effect in July, 1909. In January of this year a bulletin was published giving the microscopical and chemical analyses of sixty-four of these preparations, also a detail discussion of their value for stock and poultry and a list of the drugs used in compounding them and their uses in veterinary medicine. As this bulletin is still available it is not necessary to repeat the data given in it. A copy will be sent to any one upon request.

With few exceptions these preparations are composed of some concentrated feed as a base material, such as wheat bran, middlings, oil meal, cottonseed meal, corn meal, etc., to which are added various powdered vegetable and mineral drugs. Some of the drugs found in these powders are frequently used in veterinary medicine, while others have practically no medicinal value. In many of the preparations common salt, sulphur or charcoal are the chief ingredients which could be of value and very elaborate claims are made for these simple remedies.

It is possible to compound a tonic or conditioner of this kind which is of value, but as such a large percentage of this class of remedies now on the markets are simply packages of concentrated feeds with a small amount of cheap drugs added, the purchaser should inform himself as to the composition of the remedy he intends buying and should not be governed by the elaborate claims which are made by the manufacturers.

On the following pages will be found the microscopical and chemical analyses of the samples which have been taken by the inspectors since the bulletin on this subject was published.

In the following table are given the names of the different brands with the manufacturers, the name of the retail dealer and the weight and price of each package:

STOCK AND POULTRY FOODS, TONICS AND CONDITIONERS.

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Weight of Package—Lbs.	
					Price—Cents
75 A	Little Giant Cow Remedy	W. R. Talbot Chemical Co., Sandusky, Ohio.	Britton's Drug Store, Reidsville.	1.3	50
76 A	Little Giant Stock Powder	do	do	1.7	25
77 A	Little Giant Hog Panacea	do	do	3.0	50
78 A	Little Giant Poultry Regulator	do	do	1.6	25
79 A	Jockey Animal Powder	McCormick & Co., Baltimore, Md	R. B. Peters Grocery Co., Tarboro.	0.9	15
80 A	Victory Poultry Food	Polk Miller Drug Co., Richmond, Va	Staton & Zoeller, Tarboro	0.6	25
81 A	Wilbur's Egg Food	Wilbur Seed Meal Co., Milwaukee, Wis	do	2.0	25

STOCK AND POULTRY FOODS, TONICS AND CONDITIONERS *Continued.*

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retail Dealer	Weight of Package—Lbs.	
					Price— Cents
82 A	Andrews' Horse and Cattle Powders	Andrews Manufacturing Co., Bristol, Tenn.	Dr. Smith's Drug Store, Hert- ford.	2.2	25
83 A	Foster's Horse, Cattle and Poultry Powders	Keystone Drug Co., South Boston, Va.	Jannette Bros., Elizabeth City.	1.0	10
84 A	Prof. Gleason's Horse, Cattle and Poultry Powder	Gilbert Bros. & Co., Baltimore, Md.	Standard Drug Co., Elizabeth City.	0.7	25
85 A	Grantham's Stock Powders...	Hood & Grantham, Dunn, N. C.	W. A. Leggett, Edenton.....	.9	25
86 A	Morris' Dixie Horse and Cattle Powder	Thacher Medicine Co., Chat- tanooga, Tenn.	Vinson's Pharmacy, Halifax...	0.8	25
87 A	Blue Grass Condition Powders	Robt. L. Hamilton, Oxford, N. C.	Manufacturer.....	1.0	25
88 A	Sheridan's Cavalry Condition Powder	I. S. Johnson & Co., Boston, Mass.	Dunn's Standard Drug Store, Kinston.	0.3	25
89 A	Stock Powder.....	W. H. Smaw, Baltimore, Md.	A. J. Cook & Co., Fayetteville	0.9	25
90 A	Condition Powders.....	B. E. Sedberry's Sons, Fayette- ville, N. C.	Manufacturer.....	1.0	25
91 A	Chenango Condition Powders	Chenango Drug Co., New York, N. Y.	Ward-Loy Drug Co., Jackson- ville.	0.9	25
92 A	Dr. A. C. Daniels' Renovator Powders.	Dr. A. C. Daniels, Boston, Mass.	Sanders Drug Co., Fayetteville	0.4	50

W. R. Talbot Chemical Co.,
Sandusky, Ohio.

75 A, Little Giant Cow Remedy,
Weight of package, 1.3 lbs.; price, 50c.

Base material:

Linseed meal.

Drugs:

Nux vomica,

Gentian,

Pulsatilla,

Phytolacca,

Calcium carbonate.

76 A, Little Giant Stock Powder,
Weight of package, 1.7 lbs.; price, 25c.

Base material:

Linseed meal.

Drugs:

Fenugreek,

Charcoal,

Salt,

Epsom salts,

Glauber's salt,

Sulphur.

- 77 A, Little Giant Hog Panacea,
Weight of package, 3 lbs.; price, 50c.
Base material:
 Linseed meal,
 Dried blood.
Drugs:
 Charcoal,
 Epsom salts,
 Glauber's salt,
 Sodium bicarbonate,
 Sulphur,
 Iron oxide.
- 78 A, Little Giant Poultry Regulator,
Weight of package, 1.6 lbs.; price, 25c.
Base material:
 Linseed meal.
Drugs:
 Epsom salts,
 Iron oxide,
 Sulphur,
 Ground oyster shells.
- McCormick & Co.,
 Baltimore, Md.
- 79 A, Jockey Animal Powder,
Weight of package, 0.9 lb.; price, 15c.
Base material:
 Wheat product, screenings,
 Linseed meal.
Drugs:
 Fenugreek,
 Charcoal,
 Aniseed,
 Mustard,
 Salt,
 Epsom salts,
 Sulphur,
 Saltpeter (potassium nitrate).
- Polk Miller Drug Co.,
 Richmond, Va.
- 80 A, Victory Poultry Food,
Weight of package, 0.6 lb.; price 25c.
Base material:
 Corn meal.
Drugs:
 Gentian,
 Cinchona,
 Pepper,

Ginger,
Charcoal,
Epsom salts,
Sulphur.

Wilbur Seed Meal Co.,
Milwaukee, Wis.

- 81 A, Wilbur's Egg Food,
Weight of package, 2 lbs.; price, 25c.

Base material:

Wheat product,
Linseed meal.

Drugs:

Salt,
Epsom salts,
Iron oxide,
Sulphur.

Andrews Manufacturing Co.,
Bristol, Tenn.

- 82 A, Andrews' Horse and Cattle Powders,
Weight of package, 2.2 lbs.; price, 25c.

Base material:

Cottonseed hulls,
Wheat product.

Drugs:

Fenugreek, calcium carbonate,
Charcoal, sulphur,
Salt,
Epsom salts.

Keystone Drug Co.,
South Boston, Va.

- 83 A, Foster's Horse, Cattle and Poultry Powders,
Weight of package, 1 lb.; price, 10c.

Base material:

Linseed meal.

Drugs:

Nux vomica,
Fenugreek,
Mustard and charlock hulls,
Charcoal,
Epsom salts,
Calcium carbonate,
Sulphur.

Gilbert Bros. & Co.,
Baltimore, Md.

- 84 A, Prof. Gleason's Horse, Cattle and Poultry Powders,
Weight of package, 0.7 lb.; price, 25c.

Base material:

Wheat product,
Linseed meal.

Drugs:

Fenugreek,
Mustard hulls,
Senna leaves,
Charcoal,
Epsom salts,
Calcium carbonate,
Sulphur.

Hood & Grantham,

Dunn, N. C.

85 A, Grantham's Stock Powders.

Weight of package, 0.9 lb.; price, 25c.

Base material:

Linseed meal.

Drugs:

Nux vomica,
Ginger,
Gentian,
Salt,
Sodium bicarbonate,
Sulphur.

Thacher Medicine Co.,

Chattanooga, Tenn.

86 A, Morris' Dixie Horse and Cattle Powder,

Weight of package, 0.8 lb.; price, 25c.

Base material:

Cottonseed hulls.

Drugs:

Fenugreek,
Ginger,
Salt,
Sulphur,
Iron oxide.

Robt. L. Hamilton,

Oxford, N. C.

87 A, Blue Grass Condition Powders,

Weight of package, 1 lb.; price, 25c.

Base material:

Linseed meal.

Drugs:

Licorice,
Rosin,
Fenugreek,
Salt,

Epsom salts,
Sulphur.

L. S. Johnson & Co.,
Boston, Mass.

- 88 A. Sheridan's Cavalry Condition Powder,
Weight of package, 0.3 lb.; price, 25c.
Base material:

Linseed meal.

Drugs:

Charcoal,
Licorice,
Ginger,
Cayenne,
Glauber's salt,
Calcium carbonate,
Sulphur.

W. H. Smaw & Co.,
Baltimore, Md.

- 89 A. Stock Powder,
Weight of package, 0.9 lb.; price, 25c.
Base material:

Wheat product,
Linseed meal.

Drugs:

Rosin,
Fenugreek,
Charcoal,
Salt,
Glauber's salt,
Calcium carbonate,
Sulphur.

B. E. Sedberry's Sons,
Fayetteville, N. C.

- 90 A. Condition Powders,
Weight of package, 1 lb.; price, 25c.
Base material:

Linseed meal.

Drugs:

Fenugreek,
Rosin,
Mustard hulls,
Licorice,
Salt,
Glauber's salt,
Sulphur.

Chenango Drug Co.,
New York, N. Y.

- 91 A, Chenango Condition Powders,
Weight of package, 0.9 lb.; price, 25c.

Base material:

Linseed meal.

Drugs:

Fenugreek,

Rosin,

Ginger,

Epsom salts,

Glauber's salt,

Sulphur.

Dr. A. C. Daniels,
Boston, Mass.

- 92 A, Dr. A. C. Daniels' Renovator Powders,
Weight of package, 0.4 lb.; price, 50c.

Base material:

Linseed meal.

Drugs:

Licorice,

Elecampane root.

Ginger,

Salt,

Saltpeter (potassium nitrate),

Sodium bicarbonate.

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DIRECTOR OF FARMERS' INSTITUTES.



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B. W. KILGORE.....	State Chemist, Director Test Farms.
J. M. PICKEL.....	Assistant Chemist.
W. G. HAYWOOD.....	Fertilizer Chemist.
G. M. MACNIDER.....	Feed Chemist and Microscopist.
L. L. BRINKLEY.....	Assistant Chemist.
E. L. WORTHEM.....	Soil Investigations.
W. E. HEARN.....	Soil Survey.
W. H. STROWD.....	Assistant Chemist.
J. Q. JACKSON.....	Assistant Chemist.
E. W. THORNTON.....	Assistant Chemist.
HUBERT HILL.....	Assistant Chemist.
J. K. PLUMMER.....	Assistant Chemist.
J. F. HATCH.....	Clerk.
F. S. PUCKETT.....	Assistant to Director Test Farms.
H. H. BRIMLEY.....	Curator of Museum.
T. W. ADICKES.....	Assistant Curator.
FRANKLIN SHERMAN, JR.....	Entomologist.
Z. P. METCALF.....	Assistant Entomologist.
S. C. CLAPP.....	Assistant Entomologist in Field Work.
W. G. CHRISMAN.....	Veterinarian.
E. P. WOOD.....	Assistant Veterinarian.
B. B. FLOWE.....	Second Assistant Veterinarian.
W. H. EATON.....	Dairyman.
L. A. HIGGINS.....	Assistant Dairyman.
R. W. GRAEBER.....	Assistant Dairyman.
W. N. HUTT.....	Horticulturist.
S. B. SHAW.....	Assistant Horticulturist.
O. M. CLARK.....	Second Assistant Horticulturist.
T. B. PARKER.....	Director of Farmers' Institutes and Demonstration.
T. J. W. BROOME.....	Assistant Demonstrator.
J. M. GRAY.....	Second Assistant Demonstrator.
W. M. ALLEN.....	Pure Food Chemist.
W. A. SMITH.....	Assistant Pure Food Chemist.
.....	Assistant Pure Food Chemist.
Miss O. I. TILLMAN.....	Botanist.
Miss SUSAN D. ALLEN.....	Assistant to Botanist.
J. L. BURGESS.....	Agronomist.
G. M. GARREN.....	Assistant Agronomist.
T. F. PARKER.....	Second Assistant Agronomist.
ELDEN BAYLEY.....	Third Assistant Agronomist.

R. W. SCOTT, JR., Assistant Director, Edgcombe Test Farm, Rocky Mount, N. C.
 F. T. MEACHAM, Assistant Director, Iredell Test Farm, Statesville, N. C.
 JOHN H. JEFFERIES, Assistant Director, Pender Test Farm, Willard, N. C.
 R. W. COLLETT, Assistant Director, Transylvania and Buncombe Test Farms, Swannanoa, N. C.

*Assigned by the Bureau of Soils, United States Department of Agriculture.

RALEIGH, November 15, 1911.

SIR:—I herewith hand you my report of the Farmers' and Women's Institutes for the current year, and recommend the same for the December BULLETIN.

Respectfully submitted,

T. B. PARKER,

State Director Farmers' Institutes.

To HON. W. A. GRAHAM,

Commissioner of Agriculture.



FARMERS' INSTITUTE LECTURERS.

Top row: S. B. Shaw.
 Second row: W. G. Chrisman, T. F. Parker, A. L. French, O. M. Clark, C. W. Mason.
 Third row: Elias Carr, E. S. Millsaps, J. P. Kerr, T. E. Browne, C. L. Newman, J. M. Gray.
 Bottom row: T. B. Parker, Director; T. J. W. Broome, C. R. Hudson, W. N. Hunt, S. B. Helges, Conductor;
 F. L. Stevens.

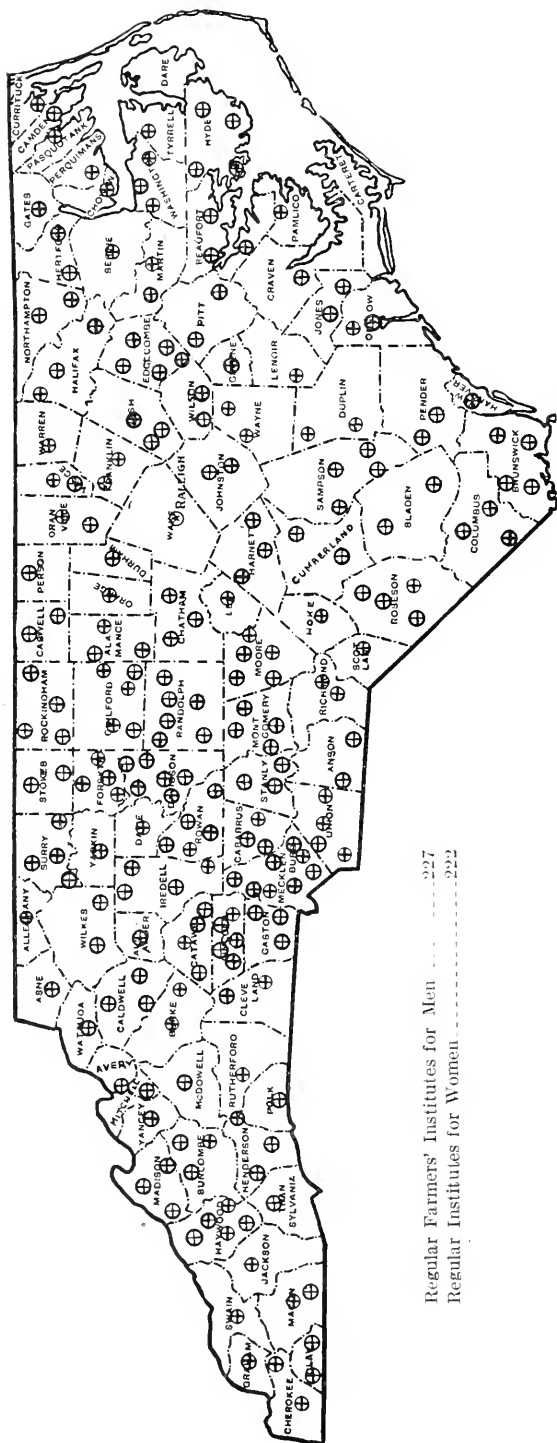


WOMEN'S INSTITUTE LECTURERS.

Top row: Miss Hopper, Miss Parker, Miss Jamison, Mrs. Calvin, Conductor;
 Mrs. Orr.
 Second row: Mrs. Bird, Miss Ward, Mrs. Hudson.
 Bottom row: Mrs. McKimmon, Mrs. Hutt, Miss Webb.



HORSE EXHIBIT AT FARMERS' INSTITUTE.



Regular Farmers' Institutes for Men 227
 Regular Institutes for Women 222

Map Showing Location of Farmers' Institutes for Men and Women Held Under the Auspices of the State Board of Agriculture in 1911.
 T. B. PARKER, Director of Farmers' Institutes.

REPORT OF FARMERS' INSTITUTE WORK, 1911.

BY T. B. PARKER, DIRECTOR.

During the Institute year, from December 1, 1910, to December 1, 1911, there have been held 471 institutes under the direction of the State Department of Agriculture. Of this number 227 were regular Farmers' Institutes for men; 222 institutes for women; 15 Orchard Demonstration Institutes; 6 Dairy Short Course Institutes, and 1 three-day Round-up Institute or Farmers' Convention. During the year institutes were held in 97 of the 100 counties in the State, Avery, Carteret, and Dare not having institutes this year.

The attendance at the various institutes and sessions was:

At men's meetings.....	33,764
At women's meetings.....	16,973
At joint session.....	6,689
At dairy short course (25 sessions).....	3,482
At orchard demonstration.....	387
At special institutes.....	1,873
At Farmers' Convention.....	1,350

Total attendance 64,518

The following table illustrates the growth of institutes in the State:

1898—	28 institutes in 27 counties.
1903—	17 institutes in 16 counties.
1904—	58 institutes in 58 counties.
1905—	79 institutes in 76 counties.
1906—	136 institutes in 91 counties.
1907—	169 institutes in 93 counties.
1908—	234 institutes in 95 counties.
1909—	247 institutes in 93 counties.
1910—	392 institutes in 96 counties.
1911—	471 institutes in 97 counties.

In addition to the above, there have been held two institutes for the negroes, several tobacco farmers' meetings, also Boys' Corn Club meetings. Each year's interest in the work increases, as is shown by the increased attendance of farmers and their families.

In the work we have been ably assisted by ministers, school teachers, and physicians living in the rural districts, as well as the newspapers of the State. The editors have given unstinted notices of the meetings and advised their farmer readers to attend them.

Premiums of \$1 were offered for the best five ears of corn, best loaf of bread, and best pair of pure-bred pigs exhibited at each institute. These premiums stimulated interest so much that at some institutes there were entries in each class; and it was rare to hold an institute where no entry was made for one or more of the premiums offered. There were more entries for the best loaf of bread than for the best five ears of corn or for the best pair of pigs.

This is the third year we have been offering premiums for the best loaf of bread, and our women institute workers who have judged the bread during these three years found a very decided improvement in the bread exhibited this year over that first exhibited. We propose continuing the premiums, and look forward for still better results.

FARMERS' INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
July 25	Alamance	Mebane	Newman, Parker, T. B., Parker, T. F., Jeffrey.
July 26	Alamance	Elon College	Newman, Parker, T. F., Jeffrey.
Aug. 23	Alamance	Friendship	Shaw, Dr. Flowe, Gray.
Aug. 16	Alexander	Taylorsville	Sherman, Parker, T. F., Millsaps.
Aug. 12	Alleghany	Sparta	Gray, Chrisman, Shaw.
Aug. 2	Anson	Morven	Broome, Worthen, Roberts.
Aug. 2	Anson	Polkton	Broome, Worthen, Roberts.
Aug. 11	Ashe	Jefferson	Gray, Chrisman, Shaw.
Jan. 14	Beaufort	Washington	Hutt, Garren, Parker, T. F.
Jan. 13	Beaufort	Aurora	Hutt, Garren, Parker, T. F.
Jan. 15	Beaufort	Pantego	Hutt, Garren.
Feb. 4	Bertie	Windsor	Hutt, Garren, Miss Tillman.
Jan. 16	Bladen	Tar Heel	Sherman, Broome, Worthen.
Jan. 18	Bladen	Council	Sherman, Broome, Parker, T. F.
Jan. 24	Brunswick	Ash	Sherman, Broome, Parker, T. F.
Jan. 25	Brunswick	Shallotte	Sherman, Broome, Parker, T. F.
Jan. 26	Brunswick	Supply	Sherman, Broome, Parker, T. F.
Jan. 27	Brunswick	Bolivia	Sherman, Broome, Parker, T. F.
July 27	Buncombe	Swannanoa	Hutt, Garren, Holmes.
July 28	Buncombe	Leicester	Hutt, Garren, Holmes.
July 29	Buncombe	Weaverville	Hutt, Garren, Holmes.
Aug. 17	Burke	Glen Alpine	Newman, Parker, T. F., Jeffrey, Miller.
Aug. 18	Burke	Connelly Springs	Newman, Jeffrey, Miller.
Aug. 1	Cabarrus	Concord	Stevens, Millsaps, Kerr.
Aug. 2	Cabarrus	Mount Pleasant	Stevens, Millsaps, Kerr, Parker, T. B.
Aug. 3	Cabarrus	Harrisburg	Stevens, Millsaps, Kerr, Parker, T. B.
Aug. 5	Caldwell	Granite Falls	Chrisman, Shaw, Gray.

FARMERS' INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State
Aug. 7	Caldwell	Oak Hill	Chrisman, Shaw, Gray.
Aug. 8	Caldwell	Lenoir	Chrisman, Shaw, Gray.
Jan. 28	Camden	Camden Courthouse	Hutt, Garren, Miss Tillman
Aug. 2	Caswell	Leasburg	Sherman, Moss, Hendricks.
Aug. 3	Caswell	Yanceyville	Sherman, Moss, Hendricks.
Aug. 3	Catawba	Sherrill's Ford	Chrisman, Shaw, Gray.
Aug. 4	Catawba	Dr. Foard's Store	Chrisman, Shaw, Gray.
Aug. 12	Catawba	Newton	Sherman, Parker, T. F., Millsaps.
Aug. 19	Catawba	Hickory	Newman, Jeffrey, Miller.
July 27	Chatham	Pittsboro	Broome, Worthen, Roberts.
Aug. 1	Chatham	Goldston	Newman, Parker, T. F., Jeffrey.
Aug. 2	Chatham	Siler City	Newman, Parker, T. F., Jeffrey.
Aug. 5	Cherokee	Murphy	Garren, Clark, Holmes.
Aug. 8	Cherokee	Andrews	Garren, Clark, French, Holmes.
Jan. 25	Chowan	Edenton	Hutt, Garren, Miss Tillman.
Aug. 4	Clay	Ogden	Garren, Clark, Holmes.
Aug. 7	Clay	Hayesville	Garren, Clark, French, Holmes.
July 29	Cleveland	Casar	Chrisman, Shaw, Gray.
Aug. 14	Cleveland	Shelby	Broome, Roberts, Miller.
Jan. 20	Columbus	Chadbourn	Sherman, Broome, Parker, T. F.
Jan. 21	Columbus	Mount Tabor	Sherman, Broome, Parker, T. F.
Jan. 23	Columbus	Old Dock	Sherman, Broome, Parker, T. F.
Feb. 1	Craven	New Bern	Parker, T. B., Shaw, Conover.
Feb. 2	Cumberland	Fayetteville	Sherman, Broome, Parker, T. F.
Feb. 3	Cumberland	Wade	Sherman, Broome, Parker, T. F.
Jan. 27	Currituck	Currituck Courthouse	Hutt, Garren, Miss Tillman.
July 27	Davidson	Wallburg	Stevens, Millsaps, Kerr.
July 28	Davidson	Enterprise	Stevens, Millsaps, Kerr.
July 29	Davidson	Reeds	Stevens, Millsaps, Kerr.
Aug. 17	Davidson	Thomasville	Sherman, Millsaps, Major Graham
Aug. 24	Davidson	Denton	Sherman, Millsaps.
Aug. 25	Davidson	Holly Grove	Sherman, Millsaps.
Aug. 8	Davie	Mocksville	Newman, Parker, T. F., Jeffrey.
Jan. 18	Duplin	Faison	Burgess, Shaw, Gray.
Jan. 20	Duplin	Kenansville	Burgess, Shaw, Dr. Chrisman.
July 31	Durham	Durham	Sherman, Moss, Hendricks.
Feb. 3	Edgecombe	Conetoe	Parker, T. B., Clark, Gray.
Feb. 6	Edgecombe	Whitakers	Parker, T. B., Clark, Gray.
Sept. 19	Edgecombe	Test Farm	Parker, T. B., Kilgore, Sherman.

FARMERS' INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Sept. 20	Edgecombe.....	Leggett.....	Parker, T. B., Kilgore, Sherman.
Aug. 5	Forsyth.....	Kernersville.....	Newman, Parker, T. F., Jeffrey.
Aug. 6	Forsyth.....	Clemmons.....	Newman, Parker, T. F., Jeffrey.
Aug. 11	Forsyth.....	Winston-Salem.....	Sherman, Parker, T. B., Parker, T. F., Ross.
Aug. 17	Forsyth.....	Rural Hall.....	Shaw, Dr. Flowe, Gray.
Feb. 7	Franklin.....	Louisburg.....	Sherman, Broome, Parker, T. F.
Feb. 8	Franklin.....	Franklinton.....	Sherman, Broome, Parker, T. F.
Jan. 31	Gates.....	Gatesville.....	Hutt, Garren, Miss Tillman.
Aug. 12	Gaston.....	Cherryville.....	Broome, Roberts, Miller.
Aug. 25	Gaston.....	Gastonia.....	Garren, Clark, French.
Aug. 26	Gaston.....	Belmont.....	Garren, Clark, French.
Aug. 9	Graham.....	Robbinsville.....	Garren, Clark, French.
Feb. 9	Granville.....	Oxford.....	Sherman, Broome, Parker, T. F.
Feb. 10	Granville.....	Creedmoor.....	Sherman, Broome, Parker, T. F.
Jan. 24	Greene.....	Snow Hill.....	Burgess, Shaw, McClane.
July 27	Guilford.....	McLeansburg.....	Newman, Parker, T. F., Jeffrey.
July 28	Guilford.....	Battleground.....	Newman, Parker, T. F., Jeffrey.
July 29	Guilford.....	Jamestown.....	Newman, Parker, T. F., Jeffrey.
Aug. 4	Guilford.....	Pleasant Garden.....	Newman, Parker, T. F., Jeffrey.
Jan. 9	Halifax.....	Halifax.....	Hutt, Garren, Parker, T. B., Parker, T. F.
Jan. 10	Halifax.....	Scotland Neck.....	Hutt, Garren, Parker, T. F.
Jan. 9	Harnett.....	Lillington.....	Sherman, Broome, Worthen.
Oct. 5	Harnett.....	Leaflet.....	Broome, Gray.
Aug. 3	Haywood.....	Canton.....	Garren, Hutt, Holmes.
Aug. 16	Haywood.....	Waynesville.....	Garren, Clark, French.
Aug. 17	Haywood.....	Crabtree.....	Garren, Clark, French.
Aug. 18	Haywood.....	Bethel.....	Garren, Clark, French.
Aug. 19	Haywood.....	Cruso.....	Garren, Clark, French.
Aug. 21	Henderson.....	Fletcher.....	Garren, Clark, French.
May 23	Henderson.....	Dana.....	Gray.
Feb. 1	Hertford.....	Winton.....	Hutt, Garren, Miss Tillman.
Feb. 4	Hertford.....	Ahoskie.....	Hutt, Garren, Miss Tillman.
Jan. 17	Hyde.....	Swan Quarter.....	Hutt, Garren, Miss Tillman.
Jan. 18	Hyde.....	Middletown.....	Snowstorm.
Jan. 19	Hyde.....	Fairfield.....	No institute held.
Jan. 20	Hyde.....	Sladesville.....	Hutt, Garren, Miss Tillman.
Aug. 11	Iredell.....	Mooreville.....	Newman, Parker, T. F., Jeffrey.
Aug. 14	Iredell.....	Cool Springs.....	Sherman, Millsaps, Parker, T. F.
Aug. 15	Iredell.....	Eupeptic Springs.....	Sherman, Millsaps, Parker, T. F.

FARMERS' INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 16	Iredell.....	Statesville.....	Newman, Parker, T. F., Jeffrey.
Aug. 15-16	Jackson.....	Sylva.....	Garren, Clark, French, Holmes.
Jan. 16	Johnston.....	Smithfield.....	Parker, T. B., Shaw, Gray, McClane.
Sept. 21	Johnston.....	Price Schoolhouse.....	Parker, T. B., Broome.
Jan. 27	Jones.....	Trenton.....	Burgess, Shaw, Chrisman.
Jan. 30	Jones.....	Pollocksville.....	Parker, T. B., Shaw, Chrisman.
July 31	Lee.....	Lee Courthouse.....	Newman, Parker, T. F., Jeffrey.
Jan. 25	Lenoir.....	Kinston.....	Burgess, Shaw, Chrisman.
Aug. 7	Lincoln.....	Iron Station.....	Broome, Parker, T. B., Roberts.
July 31	Lincoln.....	Reepsville.....	Chrisman, Shaw, Gray.
Aug. 1	Lincoln.....	Lowesville.....	Chrisman, Shaw, Gray.
Aug. 2	Lincoln.....	Denver.....	Chrisman, Shaw, Gray.
Aug. 11	Lincoln.....	Lincolnton.....	Broome, Roberts.
Aug. 12	Macon.....	Otto.....	Garren, Clark, French, Holmes.
Aug. 14	Macon.....	Franklin.....	Garren, Clark, French, Holmes.
July 31	Madison.....	Mars Hill.....	Garren, Hutt, Holmes.
Aug. 1	Madison.....	Marshall.....	Garren, Hutt, Holmes.
Aug. 2	Madison.....	Spring Creek.....	Garren, Hutt, Holmes.
Feb. 7	Martin.....	Williamston.....	Hutt, Garren, Miss Tillman.
Feb. 8	Martin.....	Robersonville.....	Hutt, Garren, Miss Tillman.
Aug. 17	McDowell.....	Marion.....	Broome, Parker, T. B., Parker, T. F., Roberts.
Aug. 4	Mecklenburg...	Observer.....	Stevens, Browne, Kerr.
Aug. 5	Mecklenburg...	Wilson Grove.....	Stevens, Browne, Kerr.
Aug. 7	Mecklenburg...	Cochran Academy.....	Stevens, Browne, Kerr.
Aug. 8	Mecklenburg...	Providence.....	Stevens, Browne, Kerr.
Aug. 9	Mecklenburg...	Paw Creek.....	Broome, Parker, T. B., Roberts.
Aug. 12	Mecklenburg...	Newells.....	Newman, Parker, T. F., Jeffrey.
Aug. 14	Mecklenburg...	Ebenezer.....	Newman, Parker, T. F., Jeffrey.
Aug. 15	Mecklenburg...	Huntersville.....	Newman, Parker, T. F., Jeffrey.
Aug. 18	Mitchell.....	Spruce Pine.....	Broome, Parker, T. B., Parker, T. F.
Aug. 19	Mitchell.....	Bakersville.....	Broome, Parker, T. B., Parker, T. F.
Aug. 15	Montgomery...	Mount Gilead.....	Stevens, Browne, Kerr.
Aug. 16	Montgomery...	Troy.....	Stevens, Browne, Kerr.
Aug. 17	Montgomery...	Star.....	Stevens, Browne, Kerr.
July 28	Moore.....	Cameron.....	Broome, Worthen, Roberts.
July 29	Moore.....	Aberdeen.....	Broome, Worthen, Roberts.
Aug. 18	Moore.....	Elise.....	Stevens, Browne, Kerr.
Aug. 19	Moore.....	West End.....	Stevens, Browne, Kerr.
Aug. 22	Moore.....	Carthage.....	Stevens, Browne, Kerr.

FARMERS' INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Feb. 4	Nash.....	Nashville.....	Shaw, Broome, Gray.
Sept. 18	Nash.....	Stanhope.....	Parker, T. B., Broome, Sherman.
Jan. 19	New Hanover..	Castle Hayne.....	Sherman, Broome, Parker, T. F.
Feb. 2	Northampton..	Rich Square.....	Hutt, Garren, Miss Tillman.
Feb. 7	Northampton..	Jackson.....	Parker, T. B., Gray, Clark.
Jan. 26	Onslow.....	Richlands.....	Burgess, Shaw, McClane.
Jan. 28	Onslow.....	Jacksonville.....	Parker, T. B., Shaw, McHenry.
Aug. 24	Orange.....	Hillsboro.....	Shaw, Flowe, Gray.
Jan. 31	Pamlico.....	Bayboro.....	Parker, T. B., Shaw.
Jan. 30	Pasquotank...	Elizabeth City.....	Hutt, Garren, Miss Tillman.
Jan. 28	Pender.....	Burgaw.....	Sherman, Broome, Parker, T. F.
Jan. 30	Pender.....	Atkinson.....	Sherman, Broome, Parker, T. F.
Aug. 1	Person.....	Roxboro.....	Sherman, Hendricks.
Jan. 26	Perquimans....	Hertford.....	Hutt, Garren, Miss Tillman.
Jan. 11	Pitt.....	Farmville.....	Parker, T. B., Hutt, Garren, Parker, T. F.
Jan. 12	Pitt.....	Grimesland.....	Hutt, Garren, Parker, T. F.
Aug. 24	Polk.....	Columbus.....	Garren, Clark, French.
Aug. 18	Randolph.....	Trinity.....	Sherman, Millsaps.
Aug. 19	Randolph.....	Randleman.....	Sherman, Millsaps.
Aug. 21	Randolph.....	Ramseur.....	Sherman, Millsaps.
Aug. 22	Randolph.....	Asheboro.....	Sherman, Millsaps.
Aug. 23	Randolph.....	Farmer.....	Sherman, Millsaps.
Aug. 3	Randolph.....	Liberty.....	Newman, Parker, T. F., Jeffrey.
July 31	Richmond.....	Hoffman.....	Broome, Worthen, Roberts.
Aug. 1	Richmond.....	Rockingham.....	Broome, Worthen, Roberts.
Jan. 11	Robeson.....	Parkton.....	Sherman, Broome, Worthen.
Jan. 12	Robeson.....	Rowland.....	Sherman, Broome, Worthen.
Jan. 13	Robeson.....	Pembroke.....	Sherman, Broome, Worthen.
Jan. 17	Robeson.....	Lumberton.....	Sherman, Broome, Parker, T. F.
Aug. 4	Rockingham...	Apple Schoolhouse.....	Sherman, Hendricks, Moss.
Aug. 5	Rockingham...	Ruffin.....	Sherman, Hendricks, Moss.
Aug. 7	Rockingham...	Bethel Church.....	Sherman, Hendricks, Moss.
Aug. 8	Rockingham...	Sylvania Schoolhouse.....	Sherman, Hendricks.
July 31	Rowan.....	China Grove.....	Stevens, Millsaps, Kerr.
Aug. 9	Rowan.....	Woodleaf.....	Newman, Parker, T. F., Jeffrey.
Aug. 9	Rowan.....	Salisbury.....	Stevens, Browne, Kerr.
Aug. 10	Rowan.....	Mount Ulla.....	Newman, Parker, T. F., Jeffrey.
Aug. 10	Rowan.....	Rockwell.....	Stevens, Browne, Kerr.
Aug. 15	Rutherford....	Ellenboro.....	Broome, Roberts, Miller.

FARMERS' INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 16	Rutherford	Rutherfordton	Broome, Roberts, Miller.
Jan. 19	Sampson	Clinton	Burgess, Shaw, Conover.
Jan. 31	Sampson	Garland	Sherman, Broome, Parker, T. F.
Feb. 1	Sampson	Roseboro	Sherman, Broome, Parker, T. F.
Jan. 14	Scotland	Laurinburg	Sherman, Broome, Parker, T. F.
Aug. 11	Stanly	Richfield	Stevens, Browne, Kerr.
Aug. 12	Stanly	Albemarle	Stevens, Browne, Kerr.
Aug. 14	Stanly	Norwood	Stevens, Browne, Kerr.
Aug. 9	Stokes	Danbury	Sherman, Hendricks.
Aug. 10	Stokes	Walnut Cove	Sherman, Hendricks.
Aug. 14	Surry	Dobson	Chrisman, Shaw, Gray, Cunningham.
Aug. 15	Surry	Mount Airy	Chrisman, Shaw, Gray, Cunningham.
Aug. 16	Surry	Pilot Mountain	Shaw, Gray, Flowe, Cunningham.
Aug. 19	Surry	Elkin	Shaw, Gray, Flowe, Cunningham.
Aug. 22	Surry	Siloam	Shaw, Gray, Flowe, Cunningham.
Aug. 10	Swain	Bryson City	Garren, Clark, French, Holmes
Aug. 22	Transylvania	Brevard	Garren, Clark, French.
Jan. 23	Tyrrell	Columbia	Hutt, Garren, Miss Tillman.
Aug. 4	Union	Marshville	Broome, Parker, T. B., Worthen, Roberts.
Aug. 5	Union	Waxhaw	Broome, Parker, T. B., Worthen, Roberts.
Aug. 7	Union	Monroe	Broome, Parker, T. B., Worthen, Roberts.
Aug. 8	Union	Indian Trail	Broome, Parker, T. B., Worthen, Roberts.
Feb. 10	Vance	Middleburg	Parker, T. B., Gray, Clark.
Feb. 11	Vance	Bear Pound Schoolhouse	Parker, T. B., Gray, Clark.
Aug. 29-31	Wake	West Raleigh	Round-up Institute.
Feb. 9	Warren	Warrenton	Parker, T. B., Gray, Clark.
Feb. 6	Washington	Plymouth	Hutt, Garren, Miss Tillman.
Jan. 24	Washington	Creswell	Hutt, Garren, Miss Tillman.
Jan. 21	Washington	Mackey's Ferry	Hutt, Garren, Miss Tillman.
Aug. 9	Watauga	Boone	Chrisman, Shaw, Gray.
Jan. 17	Wayne	Falling Creek	Parker, T. B., Shaw, Gray, McLane.
Jan. 23	Wayne	Hood's Swamp	Parker, T. B., Shaw, McLane.
Aug. 21	Wilkes	Wilkesboro	Shaw, Gray, Flowe, Cunningham.
Feb. 2	Wilson	Wilson	Shaw, Gray, Moss, McHenry.
Aug. 18	Yadkin	Yadkinville	Shaw, Gray, Flowe, Cunningham.
Aug. 21	Yancey	Burnsville	Broome, Parker, T. B., Parker, T. F.

LECTURERS AND SUBJECTS.

INSTITUTE LECTURERS, MEN.	No. Institutes Attended.	SUBJECTS.
T. J. W. BROOME..... State Department of Agriculture.	50	Soil Improvement, Corn and Cotton Culture Winter Cover Crops.
J. L. BURGESS..... Agronomist, State Department of Agriculture.	12	Relation of Crop Varieties to Soil Types. Seed Selection. Green Manuring.
T. E. BROWNE..... Farmer.	16	Peanut Culture. Corn Culture. Soil Improvement.
DR. W. G. CHRISMAN..... State Veterinarian.	19	Live Stock on the Farm. Contagious Diseases of Live Stock and How to Treat Them.
O. M. CLARK..... Assistant Horticulturist.	25	The Vegetable Garden. Orcharding. Truck Farming.
W. H. EATON..... Dairy Expert.	8	Dairying. Home Butter Making.
DR. B. B. FLOWE..... Assistant Veterinarian.	15	Diseases of Live Stock. The Care of Live Stock.
A. L. FRENCH..... Farmer.	18	Live Stock for North Carolina. Soil Improvement. Seed Selection.
G. M. GARREN..... Assistant Agronomist.	53	Soil Improvement. Corn Culture. Wheat Culture.
J. M. GRAY..... Assistant Demonstrator.	40	Soil Improvement. Corn Culture. The Advantages of Live Stock on the Farm.
M. J. HENDRICKS.....	8	Wheat Growing. Corn Culture.
W. N. HUTT..... State Horticulturist.	34	Orchard Management. Commercial Apple Growing. Pecan Culture. Small Fruits.
J. P. KERR..... Poultryman and Farmer.	23	Poultry Management. Egg Production.
J. S. JEFFREY..... Poultryman, North Carolina Experiment Station.	23	Farm Poultry. Farm Butter Making.
B. W. KILGORE..... State Chemist.	4	Commercial Fertilizers and Their Economical Uses.
GEORGE P. MILLER..... Farmer and Orchardist.	8	Orchard Management. Soil Improvement.
E. S. MILLSAPS..... Farmer Demonstrator.	19	Corn Culture. Cotton Culture. Soil Improvement.
E. W. MOSS..... Tobacco Expert.	4	Tobacco Culture.
C. L. NEWMAN..... Professor of Agriculture, Agricultural and Mechanical College.	23	Soil Improvement. Cotton Breeding. Commercial Fertilizers. Cowpeas.

LECTURERS AND SUBJECTS.

INSTITUTE LECTURERS, MEN.	No. Institutes Attended.	SUBJECTS.
T. B. PARKER Director of Farmers' Institutes and Farm Demonstration, North Carolina De- partment of Agriculture.	36	Commercial Fertilizers. Corn and Cotton Culture. Soil Improvement. Alfalfa.
T. FRANK PARKER Assistant Agronomist.	50	Live Stock on the Farm. Home-mixed Fertilizers. Soil Improvement.
DR. G. A. ROBERTS Veterinarian, Agricultural and Mechanical College.	20	Care and Feeding of Farm Work Stock Diseases of Live Stock. Types of Horses, Cattle, Sheep, and Hogs.
S. B. SHAW Assistant Horticulturist, State Depart- ment of Agriculture.	48	The Farm Vegetable Garden. Suggestions in Fruit Growing. Production and Preservation of Home Food Supplies.
FRANKLIN SHERMAN, JR. Entomologist, State Department of Agri- culture.	52	Insect Pests and How to Combat Them. Selection of Seed Corn. Suggestions for the Improvement of Farm Homes. Improved Farm Methods as Preventive of Insect Pests.
DR. F. L. STEVENS Professor of Botany and Plant Diseases, North Carolina College of Agriculture.	23	Plant Diseases and Spraying. Some Preventable Human Diseases.
MISS O. I. TILLMAN Botanist.	21	The Adulteration of Farm Seeds. Testing Seeds.
DR. E. P. WOOD Assistant Veterinarian.	3	Diseases of Live Stock.
E. L. WORTHEN Soil Investigator.	15	The Economical Use of Commercial Ferti- lizers. Fertilizers in Their Relation to Permanent Soil Improvement.

COUNTY AND LOCAL MEN'S ORGANIZATIONS.

There are Farmers' Institute committees in all the counties in which institutes are held. The duties of the members of the committees are to suggest places for the institutes, suggest topics for discussion, advertise the meetings, look after the comfort of those attending the institutes, etc. A live chairman assisted with a live committee generally have well-attended institutes.

Farmers' clubs, local Farmers' Alliances and local Farmers' Unions can greatly help the institutes by coöperating with the committees and with the conductor of the institutes. I shall be very glad to have the coöperation of all such organizations.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance.....	Charles F. Cates.....	Mebane.
Elon College.....	D. W. Brown.....	Elon College.
Alexander.....	J. N. Smith.....	Taylorsville.
Alleghany.....	S. F. Thompson.....	Walls.
Anson.....	W. J. McLendon.....	Wadesboro.
Ashe.....	John Dent.....	Jefferson.
Beaufort.....	W. D. Grimes.....	Washington.
Bertie.....	C. W. Spruill.....	Quitsna.
Bladen.....	R. B. Cromartie.....	Elizabethtown.
Council.....	T. A. Jones.....	Zara.
Tar Heel.....	S. P. McNair.....	Tar Heel.
Brunswick.....	Jack Johnson.....	Winnabow.
Supply.....	W. Sellers.....	Supply.
Shallotte.....	E. M. Parker.....	Shallotte.
Ash.....	R. M. Long.....	Ash.
Buncombe.....	R. P. Hayes.....	Asheville.
Leicester.....	A. J. Merrill.....	Leicester.
Burke.....	T. W. Drewry.....	Morganton.
Connelly Springs.....	J. E. Coulter.....	Connelly Springs.
Glen Alpine.....	John Hank.....	Glen Alpine.
Cabarrus.....	A. H. Litaker.....	Concord.
Caldwell.....	George Goforth.....	Lenoir.
Camden.....	W. G. Ferebee.....	Gregory.
Caswell.....	E. W. Lee.....	Leasburg.
Leasburg.....	T. P. Womack.....	Yanceyville.
Catawba.....	John W. Robinson.....	Newton.
Newton.....	C. E. Smyre.....	Newton.
Sherrill's Ford.....	C. M. Beatty.....	Sherrill's Ford.
Chatham.....	W. B. Wilson.....	Patmos.
Goldston.....	W. L. Goldston.....	Goldston.
Siler City.....	George Wamber.....	Siler City.
Cherokee.....	W. P. Walker.....	Andrews.
Chowan.....	Z. W. Evans.....	Tyner.
Clay.....	W. T. Bumgarner.....	Hayesville.
Cleveland.....	A. A. Warlick.....	Casar.
Columbus.....	D. Boughner.....	Chadbourn.
Tabor.....	Minos Meares.....	Tabor.
Whiteville.....	Dr. W. Ross Davis.....	Whiteville.
Old Dock.....	C. W. Suggs.....	Old Dock.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Craven	W. H. Bray	New Bern.
Cumberland	Cyrus Murphy	Fayetteville.
Currituck	J. J. Ferebee	Shawboro.
Davidson	P. J. Leonard	Lexington.
Denton	J. O. Garner	Denton.
Thomasville.	J. W. Lambeth	Thomasville.
Holly Grove	C. A. Swing	Lexington.
Davie	S. A. Woodruff	Mocksville.
Duplin	J. A. Shine	Faison.
Calypso	J. T. Albritton	Mount Olive.
Rose Hill	Maury Ward	Rose Hill.
Durham	E. J. Parrish	Durham.
Edgecombe	G. T. DeBerry	Tarboro.
Conetoe	N. B. Dawson	Conetoe.
Whitakers	M. J. Battle	Whitakers.
Forsyth	A. B. Atwood	Winston-Salem.
Kernersville	N. H. Smith	Kernersville.
Clemmons	W. A. Phelps	Clemmons.
Rural Hall	L. A. Strupe	Rural Hall.
Franklin	T. B. Wilder	Louisburg.
Franklinton	I. H. Kearney	Franklinton.
Gaston	J. Q. Rhyne	Lowell.
Bess' Chapel	C. W. Beam	Cherryville.
Gates	Lycurgus Hoffer	Gatesville.
Graham	G. B. Walker	Robbinsville.
Granville	E. G. Moss	Creedmoor.
Greene	T. E. Barrow	Farmville.
Grimsley's Church	J. T. Dixon	Farmville.
Guilford	J. Franklin Davis	Guilford College.
Gibsonville	W. C. Michall	Gibsonville.
Pleasant Garden	C. E. Hockart	Pleasant Garden.
Guilford College	J. G. Frazier	Guilford College.
McLeansville	Alexander Montgomery	McLeansville.
Battleground	J. G. Frazier	Guilford College.
Jamestown	Lee Coltrane	Jamestown.
Halifax	J. H. Sherrod	Enfield.
Scotland Neck	E. E. Hilliard	Scotland Neck.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Harnett.....	C. McArtan.....	Lillington.
Coats.....	T. D. Stewart.....	Coats.
Duke.....	A. F. Fowler.....	Duke.
Haywood.....	Dr. G. D. Green.....	Waynesville.
Canton.....	L. N. Pinner.....	Canton.
Bethel.....	J. W. Moore.....	Waynesville, R. 3.
Dellwood.....	B. P. Howell.....	Waynesville, R. 2.
Henderson.....	J. P. Fletcher.....	Fletcher.
Hertford.....	W. P. Shaw.....	Winton.
Ahoskie.....	T. E. Browne.....	Ahoskie.
Hoke.....	W. T. Covington.....	Raeford.
Hyde.....	Charles Brim.....	Swan Quarter.
Middletown.....	J. S. Mann.....	Middletown.
Iredell.....	J. W. Sherrill.....	Statesville.
Mooresville.....	W. B. Harris.....	Mooresville.
Eupeptic Springs.....	W. W. Holland.....	Charles.
Net.....	C. C. Tharpe.....	Net.
Cool Springs.....	W. F. Reece.....	Statesville, R. 7.
Jackson.....	G. P. Miller.....	Sylva.
Johnston.....	W. M. Sanders.....	Smithfield.
Kenly.....	N. R. Pike.....	Bagley.
Benson.....	J. F. Lee.....	Benson.
Jones.....	J. C. Parker.....	Pollocksville.
Lee.....	J. R. Rieves.....	Sanford.
Lenoir.....	G. F. Loftin.....	Kinston.
Lincoln.....	H. S. Robinson.....	Lincolnton.
Denver.....	T. H. Proctor.....	Denver.
McDowell.....	Dr. R. J. Burgin.....	Marion.
Macon.....	Arthur Siler.....	Franklin.
Madison.....	J. F. Bryan.....	Marshall.
Mars Hill.....	A. F. Sprinkle.....	Mars Hill.
Martin.....	P. R. Rives.....	Robersonville.
Mecklenburg.....	C. C. Moore.....	Charlotte.
Hickory Grove.....	N. S. Alexander.....	Charlotte.
Derita.....	B. J. Hunter.....	Derita.
Observer.....	Frank Irwin.....	Pineville.
Huntersville.....	J. R. Ewart.....	Huntersville.
Newells.....	J. S. Squires.....	Charlotte, R. 8.
Ebenezer.....	W. F. Baker.....	Charlotte, R. 3.
Paw Creek.....	G. H. Campbell.....	Paw Creek.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Mitchell	Joseph Bowditch	Toecane.
Spruce Pine	L. A. Berry	Spruce Pine.
Montgomery	O. B. Deaton	Troy.
Mount Gilead	R. A. Bruton	Mount Gilead.
Star	E. F. Greene	Star.
Moore	T. D. McLean	Carthage.
Elise	W. G. Carter	Carter's Mills.
Nash	S. F. Austin	Nashville.
Stanhope High School	S. H. Brantley	Spring Hope.
New Hanover	William Greggerson	Wilmington.
Northampton	J. W. Jessup	Rich Square.
Rich Square	W. E. Spivey	Rich Square.
Onslow	Dr. J. L. Nicholson	Richlands.
Pamlico	G. T. Farnell	Bayboro.
Pasquotank	R. N. Morgan	Elizabeth City.
Pender	W. M. Hand	Burgaw.
Atkinson	S. J. Moore	Atkinson.
Perquimans	M. H. White	Hertford.
Person	J. A. Long	Roxboro.
Pitt	J. F. Evans	Greenville.
Grimesland	Alston Grimes	Grimesland.
Polk	T. T. Ballinger	Tryon.
Randolph	John Beeson	Ashboro.
Trinity	N. C. English	Trinity.
Randleman	Will Lassiter	Randleman.
Ramseur	J. O. Forrester	Ramseur.
Farmer	Marvin Kearns	Farmer.
Richmond	W. C. Leak	Rockingham.
Robeson	E. F. McRae	Maxton.
Parkton	W. S. Cobb	Parkton.
Pembroke	A. N. Locklear	Pates.
Rockingham	J. V. Price	Madison.
Sylvania	T. B. Bailey	Stokesdale.
Apple Schoolhouse	J. P. Young	Reidsville, R. 1.
Ruffin	B. L. Blackwell	Pelham, R. 2.
Leaksville	J. J. Thomas	Leaksville.
Rowan	H. M. L. Agner	Salisbury.
Mount Ulla	J. K. Goodman	Mount Ulla.
Woodleaf	T. H. Gilliam	Woodleaf.
China Grove	G. Hauck	China Grove.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Rutherford	W. K. McDowell	Henrietta.
Sampson	S. H. Hobbs	Clinton.
Newton Grove	J. W. Bryan	Newton Grove.
Garland	J. D. Johnson	Garland.
Roseboro	D. W. Culbreth	Roseboro.
Spring Branch	E. A. Jackson	Cooper.
Scotland	W. N. McKenzie	Gibson.
Stanly	G. T. Dunlap	Norwood.
Stokes	I. G. Ross	Walnut Cove.
Walnut Cove	Chap. Bodenheimer	Walnut Cove.
Surry	S. C. Franklin	Mount Airy.
Mount Airy	W. J. Herring	Mount Airy.
Pilot Mountain	D. T. Denney	Pinnacle.
Swain	R. L. Sandidge	Bryson City.
Transylvania	W. H. Grogan	Brevard.
Tyrrell	W. W. Sawyer	Columbia.
Union	T. E. Williams	Monroe.
Vance	J. B. Allen	Henderson.
Middleburg	J. K. Plummer	Middleburg.
Warren	H. T. Macon	Warrenton.
Wise	P. R. Perkinson	Wise.
Washington	W. S. Davenport	Mackeys Ferry.
Creswell	W. T. Hopkins	Creswell.
Watauga	T. C. Baird	Valle Crucis.
Wayne	H. D. Ham	Goldsboro.
Wilkes	J. G. Hackett	North Wilkesboro.
Wilson	E. J. Barnes	Wilson.
Yadkin	John F. Long	Chestnut Ridge.
Yancey	W. B. Banks	Burnsville.

STATE FARMERS' CONVENTION.

State at Large	W. J. Shuford, President	Hickory.
State at Large	R. P. Hayes, Vice President	Asheville.
State at Large	J. A. Boone, Jr., Second Vice President	Lumberton.
State at Large	I. O. Schaub, Secretary and Treasurer	West Raleigh.

WOMEN'S INSTITUTES, 1911.

There has been great progress made in the State in women's institutes within the past year or two. The first women's institutes held in the State were in 1906, when 21 institutes were held in 19 counties. In 1907 we held 50 in 38 counties; in 1908, 68 were held in 46 counties; in 1909, 73 were held in 51 counties; in 1910, 173 were held in 84 counties, and in 1911, 222 were held in 97 counties, or a woman's institute held at every place, save five, where an institute for men was held. These institutes are held at the same places and at the same time that the men's institutes are held, except they are held in separate halls, unless there shall be a joint session, which we frequently have, when the men and the women meet in the same hall.

The increased number of institutes and the increased attendance at them is evidence of their popularity.

The Secretary of the State Board of Health has rendered us valuable service by sending to the institutes Health Bulletins for distribution.

The following is a partial list of the subjects discussed at these institutes:

Health Hints,
The Healthful Home,
Home Sanitation,
Best Methods of Cooking,
The Fireless Cooker,
Food and Dietetics,
The Moral Training of Our Children,
Bread-making,
Cooking of Meats,
Invalid Cookery,
Time-saving Appliances,
What to Eat and How to Prepare It,
The Farm Fruit and Vegetable Garden,
Preventable Diseases,
Insect Pests, etc.

WOMEN'S INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
July 25	Alamance	Mebane	Mrs. Hollowell, Miss Parker.
July 26	Alamance	Elon College	Mrs. Hollowell, Miss Parker.
Aug. 23	Alamance	Friendship	Mrs. Hutt, Mrs. Orr.
Aug. 16	Alexander	Taylorsville	Mrs. Bird, Miss Webb.
Aug. 12	Alleghany	Sparta	Mrs. Hutt.
Aug. 2	Anson	Morven	Miss Jamison.
Aug. 3	Anson	Polkton	Miss Jamison.
Aug. 11	Ashe	Jefferson	Mrs. Hutt.
Jan. 14	Beaufort	Washington	Mrs. Hutt.
Jan. 13	Beaufort	Aurora	Mrs. Hutt.
Jan. 16	Beaufort	Pantego	Mrs. Hutt.
Feb. 4	Bertie	Windsor	Mrs. Hutt.
Jan. 16	Bladen	Tar Heel	Mrs. Stevens.
Jan. 18	Bladen	Council	Mrs. Stevens.
Jan. 24	Brunswick	Ash	Mrs. Stevens.
Jan. 25	Brunswick	Shallotte	Mrs. Stevens.
Jan. 26	Brunswick	Supply	Mrs. Stevens.
Jan. 27	Brunswick	Bolivia	Mrs. Stevens.
July 27	Buncombe	Swannanoa	Miss Hopper, Miss Ward.
July 28	Buncombe	Leicester	Miss Hopper, Miss Ward.
July 29	Buncombe	Weaverville	Miss Hopper, Miss Ward.
Aug. 17	Burke	Glen Alpine	Mrs. Hollowell, Mrs. Wise.
Aug. 18	Burke	Connelly Springs	Mrs. Hollowell, Mrs. Wise.
Aug. 1	Cabarrus	Concord	Mrs. McKimmon, Mrs. Orr.
Aug. 2	Cabarrus	Mount Pleasant	Mrs. McKimmon, Mrs. Orr.
Aug. 3	Cabarrus	Harrisburg	Mrs. McKimmon, Mrs. Orr.
Aug. 5	Caldwell	Granite Falls	Mrs. Hutt.
Aug. 7	Caldwell	Oakhill	Mrs. Hutt.
Aug. 8	Caldwell	Lenoir	Mrs. Hutt.
Jan. 28	Camden	Camden Courthouse	Mrs. Hutt.
Aug. 2	Caswell	Leasburg	Mrs. Bird, Miss Webb.
Aug. 3	Caswell	Yanceyville	Mrs. Bird, Miss Webb.
Aug. 3	Catawba	Sherrill's Ford	Mrs. Hutt.
Aug. 4	Catawba	Dr. Ford's Store	Mrs. Hutt.
Aug. 12	Catawba	Newton	Mrs. Bird, Miss Webb.
Aug. 19	Catawba	Hickory	Mrs. Hollowell, Mrs. Wise.
July 27	Chatham	Pittsboro	Miss Jamison.
Aug. 1	Chatham	Goldston	Mrs. Hollowell, Miss Parker.
Aug. 2	Chatham	Siler City	Mrs. Hollowell, Miss Parker.

WOMEN'S INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State
Aug. 5	Cherokee	Murphy	Miss Hopper, Miss Ward.
Aug. 8	Cherokee	Andrews	Miss Hopper, Miss Ward.
Jan. 9	Chowan	Edenton	Mrs. Hutt.
Aug. 4	Clay	Ogden	Miss Hopper, Miss Ward.
Aug. 7	Clay	Hayesville	Miss Hopper, Miss Ward.
July 29	Cleveland	Casar	Mrs. Hutt.
Aug. 11	Cleveland	Shelby	Miss Jamison.
Jan. 20	Columbus	Chadbourne	Mrs. Stevens.
Jan. 21	Columbus	Mount Tabor	Mrs. Stevens.
Jan. 23	Columbus	Old Dock	Mrs. Stevens.
Feb. 1	Craven	New Bern	Mrs. Hollowell, Mrs. McKimmon.
Feb. 2	Cumberland	Fayetteville	Mrs. Stevens.
Feb. 3	Cumberland	Wade	Mrs. Stevens.
Jan. 27	Currituck	Currituck Courthouse	Mrs. Hutt.
July 27	Davidson	Wallburg	Mrs. McKimmon, Mrs. Orr.
July 28	Davidson	Enterprise	Mrs. McKimmon, Mrs. Orr.
July 29	Davidson	Reeds	Mrs. McKimmon, Mrs. Orr.
Aug. 17	Davidson	Thomasville	Miss Webb, Mrs. Bird.
Aug. 21	Davidson	Denton	Miss Webb, Mrs. Bird.
Aug. 25	Davidson	Holly Grove	Miss Webb, Mrs. Bird.
Aug. 8	Davie	Mocksville	Mrs. Hollowell, Miss Parker.
Jan. 18	Duplin	Faison	Mrs. Hollowell, Mrs. McKimmon.
Jan. 20	Duplin	Kenansville	Mrs. Hollowell, Mrs. McKimmon.
July 31	Durham	Durham	Miss Webb, Mrs. Bird.
Feb. 3	Edgecombe	Conetoe	Mrs. Hollowell, Mrs. McKimmon.
Feb. 6	Edgecombe	Whitakers	Mrs. Hollowell, Mrs. McKimmon.
Sept. 19	Edgecombe	Test Farm	Mrs. McKimmon, Miss Parker.
Sept. 20	Edgecombe	Leggett	Mrs. McKimmon, Miss Parker.
Aug. 5	Forsyth	Kernersville	Mrs. Hollowell, Miss Parker.
Aug. 6	Forsyth	Clemmons	Mrs. Hollowell, Miss Parker.
Aug. 11	Forsyth	Winston-Salem	Miss Webb, Mrs. Bird.
Aug. 17	Forsyth	Rural Hall	Mrs. Hutt.
Feb. 7	Franklin	Louisburg	Mrs. Stevens.
Feb. 8	Franklin	Franklinton	Mrs. Stevens.
Jan. 31	Gates	Gatesville	Mrs. Hutt.
Aug. 12	Gaston	Cherryville	Miss Jamison.
Aug. 25	Gaston	Gastonia	Miss Hopper, Miss Ward.
Aug. 26	Gaston	Belmont	Miss Hopper, Miss Ward.
Aug. 9	Graham	Robbinsville	Miss Hopper, Miss Ward.

WOMEN'S INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Feb. 9	Granville.....	Oxford.....	Mrs. Stevens.
Feb. 10	Granville.....	Creedmoor.....	Mrs. Stevens.
Jan. 24	Greene.....	Snow Hill.....	Mrs. Hollowell, Mrs. McKimmon.
July 27	Guilford.....	McLeansburg.....	Mrs. Hollowell, Miss Parker.
July 28	Guilford.....	Battleground.....	Mrs. Hollowell, Miss Parker.
July 29	Guilford.....	Jamestown.....	Mrs. Hollowell, Miss Parker.
Aug. 4	Guilford.....	Pleasant Garden.....	Mrs. Hollowell, Miss Parker.
Jan. 9	Halifax.....	Halifax.....	Mrs. Hutt.
Jan. 10	Halifax.....	Scotland Neck.....	Mrs. Hutt.
Jan. 9	Harnett.....	Lillington.....	Mrs. Stevens.
Oct. 5	Harnett.....	Leaflet.....	Mrs. Stevens, Mrs. McKimmon.
Aug. 3	Haywood.....	Canton.....	Miss Hopper, Miss Ward.
Aug. 16	Haywood.....	Waynesville.....	Miss Hopper, Miss Ward.
Aug. 17	Haywood.....	Crabtree.....	Miss Hopper, Miss Ward.
Aug. 18	Haywood.....	Bethel.....	Miss Hopper, Miss Ward.
Aug. 19	Haywood.....	Cruso.....	Miss Hopper, Miss Ward.
Aug. 21	Henderson.....	Fletcher.....	Miss Hopper, Miss Ward.
Aug. 23	Henderson.....	Dana.....	Miss Hopper, Miss Ward.
Feb. 1	Hertford.....	Winton.....	Mrs. Hutt.
Feb. 4	Hertford.....	Ahoskie.....	Mrs. Hutt.
Jan. 17	Hyde.....	Swan Quarter.....	Mrs. Hutt.
Jan. 18	Hyde.....	Middletown.....	Snowstorm.
Jan. 19	Hyde.....	Fairfield.....	No institute.
Jan. 20	Hyde.....	Sladesville.....	Mrs. Hutt.
Aug. 11	Iredell.....	Mooreville.....	Mrs. Hollowell, Miss Parker.
Aug. 14	Iredell.....	Cool Springs.....	Miss Webb, Mrs. Bird.
Aug. 15	Iredell.....	Eupeptic Springs.....	Miss Webb, Mrs. Bird.
Aug. 16	Iredell.....	Statesville.....	Mrs. Hollowell.
Aug. 15- 16.	Jackson.....	Sylva.....	Miss Hopper, Miss Ward.
Jan. 16	Johnston.....	Smithfield.....	Mrs. Hollowell, Mrs. McKimmon.
Sept. 21	Johnston.....	Price's Schoolhouse.....	Mrs. McKimmon, Miss Parker.
Jan. 27	Jones.....	Trenton.....	Mrs. Hollowell, Mrs. McKimmon.
Jan. 30	Jones.....	Pollocksville.....	Mrs. Hollowell, Mrs. McKimmon.
July 31	Lee.....	Lee Courthouse.....	Mrs. Hollowell, Miss Parker.
Jan. 25	Lenoir.....	Kinston.....	Mrs. Hollowell, Mrs. McKimmon.
July 31	Lincoln.....	Reepsville.....	Mrs. Hutt.
Aug. 1	Lincoln.....	Lowesville.....	Mrs. Hutt.
Aug. 2	Lincoln.....	Denver.....	Mrs. Hutt.
Aug. 7	Lincoln.....	Iron Station.....	Miss Jamison.

WOMEN'S INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 11	Lincoln	Lincolnton	Miss Jamison.
Aug. 12	Macon	Otto	Miss Hopper, Miss Ward.
Aug. 14	Macon	Franklin	Miss Hopper, Miss Ward.
July 31	Madison	Mars Hill	Miss Hopper, Miss Ward.
Aug. 1	Madison	Marshall	Miss Hopper, Miss Ward.
Aug. 2	Madison	Spring Creek	Miss Hopper, Miss Ward.
Feb. 7	Martin	Williamston	Mrs. Hutt.
Feb. 8	Martin	Robersonville	Mrs. Hutt.
Aug. 17	McDowell	Marion	Miss Jamison, Miss Parker.
Aug. 4	Mecklenburg	Observer	Mrs. McKimmon, Mrs. Orr.
Aug. 5	Mecklenburg	Wilson Grove	Mrs. McKimmon, Mrs. Orr.
Aug. 7	Mecklenburg	Cochran Academy	Mrs. McKimmon, Mrs. Orr.
Aug. 8	Mecklenburg	Providencè	Mrs. McKimmon, Mrs. Orr.
Aug. 9	Mecklenburg	Paw Creek	Miss Jamison.
Aug. 12	Mecklenburg	Newells	Mrs. Hollowell, Miss Parker.
Aug. 14	Mecklenburg	Ebenezer	Mrs. Hollowell, Miss Parker.
Aug. 15	Mecklenburg	Huntersville	Mrs. Hollowell, Miss Parker.
Aug. 18	Mitchell	Spruce Pine	Miss Jamison, Miss Parker.
Aug. 19	Mitchell	Bakersville	Miss Jamison, Miss Parker.
Aug. 15	Montgomery	Mount Gilead	Mrs. McKimmon, Mrs. Stevens.
Aug. 16	Montgomery	Troy	Mrs. Stevens, Mrs. McKimmon.
Aug. 17	Montgomery	Star	Mrs. Stevens, Mrs. McKimmon.
July 28	Moore	Cameron	Miss Jamison.
July 29	Moore	Aberdeen	Miss Jamison.
Aug. 18	Moore	Elise	Mrs. Stevens, Mrs. McKimmon.
Aug. 19	Moore	West End	Mrs. Stevens, Mrs. McKimmon.
Aug. 22	Moore	Carthage	Mrs. Stevens, Mrs. McKimmon.
Feb. 4	Nash	Nashville	Mrs. Hollowell, Mrs. McKimmon.
Sept. 18	Nash	Stanhope	Mrs. McKimmon, Miss Parker.
Jan. 19	New Hanover	Castle Hayne	Mrs. Stevens.
Feb. 2	Northampton	Rich Square	Mrs. Hutt.
Feb. 7	Northampton	Jackson	Mrs. Hollowell, Mrs. McKimmon.
Jan. 26	Onslow	Richlands	Mrs. Hollowell, Mrs. McKimmon.
Jan. 28	Onslow	Jacksonville	Mrs. Hollowell, Mrs. McKimmon.
Aug. 24	Orange	Hillsboro	Mrs. Hutt, Mrs. Orr.
Jan. 31	Pamlico	Bayboro	Mrs. Hollowell, Mrs. McKimmon.
Jan. 30	Pasquotank	Elizabeth City	Mrs. Hutt.
Jan. 28	Pender	Burgaw	Mrs. Stevens.
Jan. 30	Pender	Atkinson	Mrs. Stevens.

WOMEN'S INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 1	Person	Roxboro	Mrs. Bird, Miss Webb.
Jan. 26	Perquimans	Hertford	Mrs. Hutt.
Jan. 11	Pitt	Farmville	Mrs. Hutt.
Jan. 12	Pitt	Grimesville	Mrs. Hutt.
Aug. 24	Polk	Columbus	Miss Hopper, Miss Ward.
Aug. 18	Randolph	Trinity	Mrs. Bird, Miss Webb.
Aug. 19	Randolph	Randleman	Mrs. Bird, Miss Webb.
Aug. 21	Randolph	Ramseur	Mrs. Bird, Miss Webb.
Aug. 22	Randolph	Asheboro	Mrs. Bird, Miss Webb.
Aug. 23	Randolph	Farmer	Mrs. Bird, Miss Webb.
Aug. 3	Randolph	Liberty	Mrs. Hollowell, Miss Parker.
July 31	Richmond	Hoffman	Miss Jamison.
Aug. 1	Richmond	Rockingham	*Miss Jamison.
Jan. 11	Robeson	Parkton	Mrs. Stevens.
Jan. 12	Robeson	Rowland	Mrs. Stevens.
Jan. 13	Robeson	Pembroke	Mrs. Stevens.
Jan. 17	Robeson	Lumberton	Mrs. Stevens.
Aug. 4	Rockingham	Apple Schoolhouse	Mrs. Bird, Miss Webb.
Aug. 5	Rockingham	Ruffin	Mrs. Bird, Miss Webb.
Aug. 7	Rockingham	Bethel Church	Mrs. Bird, Miss Webb.
Aug. 8	Rockingham	Sylvania	Mrs. Bird, Miss Webb.
July 31	Rowan	China Grove	Mrs. McKimmon, Mrs. Orr.
Aug. 9	Rowan	Woodleaf	Mrs. Hollowell, Miss Parker.
Aug. 9	Rowan	Salisbury	Mrs. McKimmon, Mrs. Orr.
Aug. 10	Rowan	Mount Ulla	Mrs. Hollowell, Miss Parker.
Aug. 10	Rowan	Rockwell	Mrs. McKimmon, Mrs. Orr.
Aug. 15	Rutherford	Ellenboro	Miss Jamison.
Aug. 16	Rutherford	Rutherfordton	Miss Jamison.
Jan. 19	Sampson	Clinton	Mrs. Hollowell, Mrs. McKimmon.
Jan. 31	Sampson	Garland	Mrs. Stevens.
Feb. 1	Sampson	Roseboro	Mrs. Stevens.
Jan. 14	Scotland	Laurinburg	Mrs. Stevens.
Aug. 11	Stanly	Richfield	Mrs. Stevens, Mrs. McKimmon.
Aug. 12	Stanly	Albemarle	Mrs. Stevens, Mrs. McKimmon.
Aug. 14	Stanly	Norwood	Mrs. Stevens, Mrs. McKimmon.
Aug. 9	Stokes	Danbury	Mrs. Bird, Miss Webb.
Aug. 10	Stokes	Walnut Cove	Mrs. Bird, Miss Webb.
Aug. 14	Surry	Dobson	Mrs. Hutt.
Aug. 15	Surry	Mount Airy	Mrs. Hutt.

WOMEN'S INSTITUTES, 1911.

Date.	County.	Location.	Lecturers Supplied by the State.
Aug. 16	Surry	Pilot Mountain	Mrs. Hutt.
Aug. 19	Surry	Elkin	Mrs. Hutt.
Aug. 22	Surry	Siloam	Mrs. Hutt.
Aug. 10	Swain	Bryson City	Miss Hopper, Miss Ward.
Aug. 22	Transylvania	Brevard	Miss Hopper, Miss Ward.
Jan. 23	Tyrrell	Columbia	Mrs. Hutt.
Aug. 4	Union	Marshville	Miss Jamison.
Aug. 5	Union	Waxhaw	Miss Jamison.
Aug. 7	Union	Monroe	Miss Jamison.
Aug. 8	Union	Indian Trail	Miss Jamison.
Feb. 10	Vance	Middleburg	Mrs. Hollowell, Mrs. McKimmon.
Feb. 11	Vance	Bear Pond Schoolhouse	Mrs. Hollowell, Mrs. McKimmon.
Aug. 29- 31	Wake	West Raleigh	Round-up Institute.
Feb. 9	Warren	Warrenton	Mrs. Hollowell, Mrs. McKimmon.
Feb. 6	Washington	Plymouth	Mrs. Hutt.
Jan. 24	Washington	Creswell	Mrs. Hutt.
Jan. 21	Washington	Mackey's Ferry	Mrs. Hutt.
Aug. 9	Watauga	Boone	Mrs. Hutt.
Jan. 17	Wayne	Falling Creek	Mrs. Hollowell, Mrs. McKimmon.
Jan. 23	Wayne	Hood's Swamp	Mrs. Hollowell, Mrs. McKimmon.
Aug. 21	Wilkes	Wilkesboro	Mrs. Hutt.
Feb. 2	Wilson	Wilson	Mrs. Hollowell, Mrs. McKimmon.
Aug. 18	Yadkin	Yadkinville	Mrs. Hutt.
Aug. 21	Yancey	Burnsville	Miss Jamison, Miss Parker.

LECTURERS AND SUBJECTS.

INSTITUTE LECTURERS, WOMEN.	No. Institutes Attended.	SUBJECTS.
MRS. ALDA M. BIRD..... Teacher.	23	The Healthful Home. Sanitation.
MRS. SUE V. HOLLOWELL.....	45	
MISS MINNIE W. HOPPER..... In charge of Domestic Science, Brevard Institute.	26	Best Methods of Cooking. Sanitation vs. Household Pets. Dressmaking.
MRS. W. N. HUTT.....	50	
MISS MINNIE L. JAMISON.....	23	Fireless Cooking, etc.
MRS. CHARLES McKIMMON.....	54	
MRS. EMELIE MCG. ORR.....	18	Health on the Farm. Food and Dietetics. The Moral Training of Our Children.
MISS KATHARINE PARKER.....	26	Health Hints. Bread-making. Cooking of Meats.
MRS. F. L. STEVENS.....	43	
MISS JANE WARD.....	26	Invalid Cookery Household Economics.
MISS LUCIE T. WEBB.....	26	The Country Home. Time-saving Appliances.

COUNTY AND LOCAL WOMEN'S ORGANIZATIONS.

The plan of organization of the Women's Institutes is the same as for men. A live, interested woman is selected for chairman, and she is given the assistance of the best committee that can be selected for that purpose.

CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Alamance.....	Mrs. R. W. Scott.....	Haw River.
Friendship High School	Miss Malona Patterson.....	Burlington
Alexander.....	Mrs. W. J. Reese.....	Taylorsville.
Alleghany.....	Mrs. G. D. Brown.....	Sparta.
Anson.....	Mrs. Charles May.....	Morven.
Polkton.....	Mrs. S. K. Harris.....	Polkton.
Ashe.....	Mrs. Robert L. Ballou.....	Jefferson.
Bertie.....	Mrs. E. L. Gatling.....	Windsor.
Bladen.....	Mrs. N. A. Layton.....	White Oak.
Council.....	Mrs. E. B. Council.....	Council.

CHAIRMEN OF COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Brunswick.....	Mrs. S. K. Mentz.....	Mill Branch.
Shallotte.....	Mrs. C. S. Hewette.....	Shallotte.
Supply.....	Mrs. R. W. McKeithan.....	Supply.
Bolivia.....	Mrs. David Mercer.....	Suburb.
Buncombe.....	Mrs. R. S. Thrash.....	Asheville.
Burke.....	Mrs. Z. B. Henderson.....	Worry.
Connelly Springs.....	Mrs. H. C. Gooden.....	Connelly Springs.
Cabarrus.....	Mrs. Constance Cline.....	Concord.
Mount Pleasant.....	Mrs. D. D. Barrier.....	Mount Pleasant.
Harrisburg.....	Miss Mary Green.....	Harrisburg.
Caldwell.....	Mrs. J. F. Steele.....	Lenoir.
Oak Hill.....	Mrs. H. M. Crowells.....	Lenoir, R. F. D.
Granite Falls.....	Mrs. C. T. Flowers.....	Granite Falls.
Camden.....	Mrs. E. I. Sawyer.....	
Caswell.....	Miss Bessie Thompson.....	Leasburg.
Catawba.....	Mrs. J. W. Robinson.....	Newton.
Foard's Store.....	Mrs. A. R. Propst.....	Henry.
Chatham.....	Mrs. J. R. Matthews.....	New Hill.
Goldston.....	Miss Mary Robinson.....	Goldston.
Siler City.....	Mrs. D. L. Webster.....	Siler City.
Chowan.....	Mrs. D. G. Bond.....	Edenton.
Cleveland.....	Mrs. J. A. Wilson.....	Shelby.
Casar.....	Mrs. Eliza Richards.....	Casar.
Columbus.....	Mrs. E. H. Miller.....	Chadbourn.
Mount Tabor.....	Mrs. U. N. Norris.....	Mount Tabor.
Old Dock.....	Miss Ira Beatty.....	Old Dock.
Craven.....	Mrs. W. B. Spock.....	Askin.
Cumberland.....	Mrs. W. G. Holmes.....	Westova.
Wade.....	Mrs. H. A. Bain.....	Wade.
Currituck.....	Miss Nettie Dozier.....	Coinjock.
Davidson.....	Mrs. S. H. Orrender.....	Thomasville.
Denton.....	Mrs. H. M. Skeen.....	Denton.
Holly Grove.....	Mrs. C. A. Swing.....	Holly Grove.
Wallburg.....	Mrs. McCuiston.....	Lexington.
Enterprise.....	Mrs. J. L. Zimmerman.....	Enterprise.
Reeds.....	Mrs. M. L. Mock.....	Reeds.
Davie.....	Miss Linda Clement.....	Mocksville.
Duplin.....	Miss Fannie Faison.....	Faison.
Kenansville.....	Mrs. W. B. Taylor.....	Magnolia.

CHAIRMEN OF COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Durham	Mrs. I. W. Shields	Durham.
Edgecombe	Miss Lucy Staton	Speed.
Whitakers	Mrs. Oscar Hearne	Whitakers.
Forsyth	Mrs. J. R. Snyder	Winston-Salem.
Clemmons	Mrs. T. W. Grithith	Clemmons.
Kernersville	Mrs. C. H. Beard	Kernersville.
Franklin	Mrs. J. H. McGee	Franklinton.
Gaston	Mrs. J. N. McIntosh	Stanley.
Cherryville	Mrs. C. A. Witherspoon	Bessemer City.
Granville	Mrs. S. A. Fleming	Hester.
Greene	Mrs. J. T. H. Harper	Snow Hill.
Guilford, Jamestown	Mrs. J. L. Armfield	Jamestown.
Pleasant Garden	Mrs. J. W. Rockett	Pleasant Garden.
Battleground	Mrs. Nerens Ballinger	Greensboro, R. F. D.
Halifax	Mrs. W. L. Wiggins	Littleton.
Harnett	Miss Katie Withers	Broadway.
Hoke	Mrs. T. B. Upchurch	Raeford.
Iredell	Mrs. Crawford Johnson	Mooreville.
Cool Spring	Mrs. D. P. Sartin	Statesville, R. F. D.
Jackson	Mrs. E. G. McKee	Sylva.
Johnston	Mrs. W. M. Sanders	Smithfield.
Jones	Miss Estelle Murray	Trenton.
Pollockville	Mrs. G. R. Hughes	Pollockville.
Lee	Mrs. D. D. Bouie	Jonesboro.
Lenoir	Mrs. Frank Grady	Kinston.
Lincoln	Mrs. J. S. Warlick	Lincolnton.
Reepsville	Mrs. T. M. Wilson	Reepsville.
Iron Station	Mrs. L. A. Dellinger	Iron Station.
Denver	Mrs. W. J. Wingate	Iron Station.
McDowell	Mrs. S. B. Tate	Bridgewater.
Macon	Mrs. Henry Slagle	Franklin.
Martin	Mrs. W. T. Taylor	Robersonville.
Mecklenburg, Ebenezer	Mrs. W. T. Baker	Charlotte, R. 2.
Huntersville	Mrs. W. E. Alexander	Huntersville.
Paw Creek	Mrs. L. S. Houser	Charlotte, R. 6.
Observer	Miss Porter	Charlotte, R. 12.
Wilsons Grove	Miss Annie Davis	Charlotte, R. 11.
Cochran Academy	Mrs. W. L. Hood	Matthews, R. 19.
Providence Church	Mrs. D. J. Davis	Matthews, R. 17.
Newells	Mrs. J. H. Newell	Newells.

CHAIRMEN OF COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Mitchell	Mrs. W. L. Lambert	Bakersville.
Spruce Pine	Mrs. C. T. Hickey	Spruce Pine.
Montgomery	Mrs. B. T. Wade	Troy.
Mount Gilead	Mrs. L. P. Bird	Mount Gilead.
Star	Mrs. E. F. Green	Star.
Moore	Mrs. H. F. Seawell	Carthage.
Cameron	Miss Katherine Arnold	Cameron.
West End	Miss Ersley Lewis	West End.
Aberdeen	Miss May Miller	Aberdeen.
Nash	Mrs. J. Y. Strickland	Nashville.
New Hanover	Mrs. S. A. Cooper	Castle Hayne.
Northampton	Mrs. J. L. Lester	Jackson.
Onslow	Mrs. J. E. Rhodes	Richlands.
Orange	Mrs. N. R. Cole	Chapel Hill.
Pamlico	Mrs. G. T. Farnell	Bayboro.
Pasquotank	Mrs. R. N. Morgan	Elizabeth City.
Pender	Mrs. E. McMoore	Burgaw.
Atkinson	Mrs. George Moore	Atkinson.
Perquimans	Mrs. Carrie Perry	Belvidere.
Person	Mrs. W. E. Morton	Roxboro.
Randolph	Mrs. W. J. Love	Kemp's Mill.
Randleman	Mrs. S. E. Coble	Climax.
Trinity	Mrs. J. A. Carpenter	Trinity.
Ramseur	Mrs. N. J. Forrester	Ramseur.
Farmer	Mrs. C. C. Hubbard	Farmer.
Richmond	Miss Maggie McLeod	Hoffman.
Robeson	Mrs. William McCallum	Rowland.
Rockingham	Mrs. L. L. Harrelson	Ruffin.
Sylvania Schoolhouse	Mrs. E. L. Bennett	Stokesdale.
Apple Schoolhouse	Miss Annie I. Slade	McIver.
Rowan	Miss Maggie Julian	Salisbury.
China Grove	Mrs. Robert Gray	China Grove.
Rockwell	Mrs. G. W. Choate	Rockwell.
Mount Ulla	Mrs. J. H. Bailey	Mount Ulla.
Rutherford	Mrs. J. L. Greene	Rutherfordton.
Ellenboro	Mrs. J. N. Jones	Rutherfordton, R. 3.
Sampson	Mrs. Alvin Royall	Clinton.
Roseboro	Mrs. E. T. Turlington	Salemberg.
Ingold	Mrs. W. B. Lamb	Ingold.

CHAIRMEN OF COUNTY AND LOCAL WOMEN'S INSTITUTE COMMITTEES.

County.	Chairman of Committee.	Post-office.
Scotland.....	Mrs. Perry Turner.....	Laurinburg.
Stanly.....	Mrs. G. M. Reap.....	Efird's Mill.
Norwood.....	Mrs. C. Atkins.....	Norwood.
Richfield.....	Mrs. J. A. Ritchie.....	Richfield.
Stokes.....	Mrs. R. L. Hartman.....	Hartman.
Walnut Cove.....	Mrs. G. W. Newman.....	Walnut Cove.
Surry.....	Mrs. P. J. Lester.....	Mount Airy.
Pilot Mountain.....	Mrs. A. C. Griffin.....	Rural Hall.
Elkin.....	Mrs. L. G. Hurt.....	Elkin.
Siloam.....	Mrs. T. W. Apperson.....	Siloam.
Swain.....	Mrs. A. M. Fry.....	Bryson City.
Tyrrell.....	Mrs. C. W. Swain.....	Jerry.
Union.....	Mrs. J. B. Mangum.....	Monroe.
Marshville.....	Mrs. W. M. Holmes.....	Marshville.
Waxhaw.....	Miss Emma Richardson.....	Waxhaw.
Indian Trail.....	Mrs. J. W. Rollings.....	Indian Trail.
Vance.....	Mrs. J. A. Fleming.....	Middleburg.
Bear Pond.....	Mrs. J. E. Gill.....	Henderson, R. I.
Wake.....	Mrs. W. G. Clements.....	Morrisville.
Warren.....	Mrs. F. B. Newell.....	Warrenton.
Littleton.....	Mrs. L. N. Bagley.....	Littleton.
Washington.....	Mrs. B. F. Spruill.....	Creswell.
Watauga.....	Mrs. J. F. Hardin.....	Boone.
Wayne, Falling Creek.....	Mrs. E. A. Stevens.....	Goldsboro, R. F. D.
Wilkes.....	Mrs. P. E. Brown.....	Wilkesboro.
Yadkin.....	Mrs. H. H. Mackey.....	Yadkinville.
Yancey.....	Mrs. C. L. Ruffin.....	Burnsville.

WOMEN'S STATE CONVENTION.

Mrs. Charles McKimmon.....	Secretary.....	Raleigh, N. C.
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DEMONSTRATION RAILWAY CARS.

For the past three years the State Department of Agriculture has been operating demonstration trains for institute work. These trains have been generously furnished by the Seaboard Air Line and Southern railways. During the past summer fifty of these demonstration train institutes were held. The trains consisted of passenger coaches fitted up with an oil stove, kitchen cabinet, sink, ice box, together with cooking utensils of modern design intended to lighten women's work in the kitchen. In the passenger coach the women held their meetings, delivered lectures and demonstrated the use of the various cooking utensils, served lunches, etc.

The following manufacturers, whom I consider reliable, and who will be glad to answer questions in regard to their wares, have contributed to the Institute Train:

Bateman Manufacturing Company, Grenloch, N. J. Agricultural implements, riding cultivators, garden plows.

Raney Canning Company, Chapel Hill. Canning outfit.

Standard Oil Company, Baltimore, Md. Oil stoves, heaters and lamps.

G. L. Vinson Company, Raleigh, N. C. Kitchen sinks, etc.

Royall & Borden Company, Raleigh. Kitchen cabinet, etc.

Western Implement Company, Port Washington, Wis. Riding plow attachment.

Hart-Ward Hardware Company, Raleigh, N. C., for Landers, Frary & Clark. Bread mixer, cake mixer, meat cutter, coffee percolator, etc.

William Campbell & Co., Detroit, Mich. Fireless cooker.

Manson-Campbell Company, Detroit, Mich. Fireless cooker.

ORCHARD DEMONSTRATIONS.

During the Spring of 1911 Apple Spraying Demonstration has been conducted along the lines of former years. Each demonstration was held in the orchard and witnessed by the farmers of the community who were interested in the work. In some instances they came several miles to attend the demonstration.

The work was done by the coöperation of the Divisions of Horticulture and Entomology, the Division of Horticulture doing the pruning and the Division of Entomology doing the spraying.

These meetings were as follows:

County.	Address.	Owner of Orchard.
Alamance.....	Haw River.....	R. W. Scott, Jr.
Alexander.....	Davidson College.....	Dr. H. L. Smith (Taylorsville).
Beaufort.....	Washington.....	W. T. Bailey, Jr.
Caldwell.....	Lenoir, R. F. D. 3.....	S. N. Swanson.
Cleveland.....	Casar.....	Zero Mull.
Craven.....	New Bern.....	O. R. Perry.
Guilford.....	Greensboro, R. F. D. 2.....	C. M. Pritchett.
Guilford.....	Climax.....	J. M. Field.
Iredell.....	Mooreville.....	H. C. Johnston.
McDowell.....	Marion.....	J. L. C. Bird.
Mecklenburg.....	Charlotte.....	Charles E. Clark.
Rockingham.....	Wentworth, R. F. D. 1.....	W. M. Gunn.
Rutherfordton.....	Hollis.....	J. P. Withrow.
Surry.....	Crutchfield.....	J. Luther Wood.
Yadkin.....	Courtney.....	J. D. Reavis.

LECTURES DELIVERED.

THE MORAL TRAINING OF OUR CHILDREN.

BY MRS. EMELIE MCGILVARY ORR.

We hear a great deal about physical health on the farm, and how to attain it; but I often wonder whether we pay as much attention to the moral health of our children.

One would think that the problems of child-rearing, in the country, would almost solve themselves; and that, surrounded, as country children are, by the beauties of nature, and removed from the supposed contaminations of city and town conditions, they would know nothing but obedience, truthfulness, and purity.

When I speak of obedience, truthfulness, and purity, I do so because, with the fear of God, they are the foundations of character. To try to form a character with any one of these left out is like building a house with one of the corners unsupported. A child may be taught obedience and purity, but if he is not truthful he will not make a good man. Or, he may be pure and truthful, but if not obedient, he will not make a good man.

In how few homes are the children taught absolute, unquestioning, cheerful obedience! Mothers and fathers are to blame for this; yet they blame their children. I am aware that these requirements are old-fashioned; but I am willing to submit this question to any impartial observer, Does the product justify modern methods? Whenever you see a family where the parents consider these requisites as out of date, there you find the children falling short of the ideal. This is the trouble, now, with our so-called civilization: we have lawlessness on all sides, because as children our citizens were not taught absolute obedience. Obedience is not obedience if given grudgingly, pontingly, reluctantly. Parents give commands, and then do not see that they are obeyed; and if disobeyed, the punishment may or may not be administered, according to the feelings of the parent at the time. How often do we see a parent punishing a child for a certain offense—not according to the demerits of the case, but because he is angry, or she is "nervous"; whereas, at another time, that same act would have been ignored. Some parents have said to me, "Well, if I did not punish my child when I was 'mad,' I never would do it." Sad commentary, that, on the justice of the parent and the object of his discipline! A child's sense of justice is keen, often far more so than the adult's, and he can see whether you are punishing him for his good or to relieve your own feelings.

How often, too, one sees either father or mother thinking the other too strict, and so expressing himself before the children! In too many cases the punishments are administered by one, only, of the parents; the other even openly expressing disapproval, or, by silence, possibly, taking the child's part! But *the child knows* it. "A house divided against itself cannot stand," and full measure of success cannot be expected without coöperation and unity between parents.

A great mistake made is in postponing the time of commencing the training and discipline. Some say let the child alone until about two years of age. Others, most disastrously, wait even longer. I believe one should commence at once. A babe of three days has commenced to learn one of two lessons—either that, by crying, he can obtain his own way, say to be taken out of bed, or that he gains nothing by crying for what he wants. The wise and loving ear soon distinguishes between the cry of hunger or pain and that of willfulness or temper. If you are uncertain, try the babe. If, on being taken up, it ceases its crying, then renews it when replaced in bed, you may be sure there was nothing but temper or willfulness. I knew a young couple who, on the fourth night after their first babe arrived, were distressed, believ-

ing the babe was ill with colic. The experienced aunt listened and said it was not the cry of pain, but that the babe wished to be taken up. The parents could not believe that the child could so early know its own will. To prove her point, the aunt took the babe up. It ceased its crying. She replaced it in the crib and the crying commenced again. She insisted that they should save themselves and the child many sleepless, or rather, disturbed nights—and let it “cry it out.” They did; but it required an hour and a half before the child came to a realization that his crying could not force any one to give him his way. Then he ceased, and went to sleep quietly, as a good baby should. The next night the same performance was repeated, and at the same time, but it lasted less than an hour. The third night he woke and cried for about fifteen minutes. The fourth night he woke without any crying. The fifth, the victory was complete. The child slept through the night, and nevermore gave the parents any midnight horrors. Better, still, the child had learned a valuable lesson. These parents, too, learned just as valuable a one: that by patient determination they could bring the child to the right. The *process* of learning, I doubt not, was even harder for the parents than for the child.

In the process of spoiling a child, I really believe that the parents become even more badly spoiled, in that more and more they lose confidence in themselves and in their power to carry out their own commands.

I would urge every mother of a young babe to commence at the very first. If there are mothers here who have older children who have not been taught perfect obedience, that you resolve, first, to be firm with yourself, to hold yourself unflinchingly to your duty; then that you will go home and give the children “no quarter,” as it were, until you and they together have learned this fundamental lesson—that it is yours to train and control, theirs to obey. For an unrestrained, uncontrolled child of several years of age, the lesson is much harder; so you will need greater firmness with yourself as well as with your child. You will need to meet *every* act of disobedience, or pouting, or reluctance with its punishment—a dozen times a day if necessary. Two weeks of this will more than likely be all-sufficient to show the child that you *must* be obeyed. Once the child understands this, the battle is won. You will need little more thereafter than to watch—not only your child, but yourself—that you hold the ground you have gained, ruling with a steady, firm, kind hand. The means and method for attaining this? If you have the great moral strength *possessed by very few*, you will be able to secure the end without punishment or chastisement. If, however, you belong to the average class, you will fail utterly unless you resort, at least occasionally, to some form of punishment. For myself, I am a firm believer in the keen switch—not the hand nor the heavy rule, but the keen switch which stings, hurts, but does not bruise. Never, I pray you, punish in anger nor slap the child about the face or head! Do you say you have no time for all this? Then you have no time to be a mother; you should not have married, nor brought children into the world. Now that they are here—mind you, through no choice of theirs—you are bound to train them aright, or how dare you meet them at God’s judgment bar? The older I grow the more convinced I am that a parent can show a child no greater unkindness than to fail to train him in obedience. A friend of mine, the mother of four children, says that *laziness* on the part of parents is the cause of improperly controlled children; and the more I think of it the more convinced I am that she is right. We fail in our duty to our children through laziness, even though we be never so industrious in other lines, and then we deceive ourselves into thinking that we are loving, tender hearted!

This controlling the children should, invariably, go hand in hand with loving sympathy with them in their joys and in their sorrows. It is not enough to feel this sympathy, but we should take time to show it in our participation with them in their interests. When the two—the firm control and sympathy—are thus linked together, there is no danger of losing the child’s love. Have you not seen it, time and again, that the parent who was most strict, if also loving, was the one the child loved most? With my own children, I have never known it to fail, that they were much more loving and affectionate, for

days after a punishment, than before; and if they were not, I knew I had not carried the matter to a finish. You parents who have not tried this seemingly anomalous way of increasing, strengthening, your children's love for you, try it and be convinced.

In regard to truthfulness, I believe that example, coupled, of course, with precept, counts for more than anything else. This means that the mother cannot give a short pound of butter, nor the father a short cord of wood, or bushel of apples, say, and then expect to be able to train the child into truthfulness. How often will a parent deceive a child, tell him the "bad man will get him," or the like, then *reprove the child* for an untruth! We cannot be too careful about this, nor set too high a value on it, in our dealings with our children. I am often astonished to hear a parent *laughingly*, jokingly, tell of some untruth or dishonesty practiced by some one else. The Scriptures tell us that "fools make a mock of sin"; that is, a joke of it!

We must beware, too, of being prejudiced into thinking that because the children are *ours* they must be truthful. In my twelve years of teaching, I learned that in this particular point parents are most easily deceived. Over and over again parents have said to me, "I know that Mary, or Sallie, or Jim, has many faults, but untruthfulness is not one of them." This, when all mates and teachers knew the child to be false. Because truthfulness is so closely associated with and so decisively affects one's attitude toward property, I hold that we cannot properly train our children in the former, if we neglect to prepare them for the acquiring and use of the latter. We try to fit them for many another demand to come, later in life, but how many of us deliberately plan to train them in money earning and money spending? There are some parents who give their child a crippled chicken, or lamb, or troublesome calf to raise for his own. When old enough to be put on the market and converted into cash, that calf, say, is taken, arbitrarily, without consulting the rightful owner, and sold; then what? Often all the money is appropriated by the parent. Usually a small part is condescendingly given (!) to the child. The child's sense of justice is thereby wronged, so that, as in a case of a man I know, fifty years have failed to obliterate the feeling of bitterness against the lawlessness of his parent. The child by this course is taught to disregard rightful ownership. The better plan is to have a talk with your child. Tell him you wish him to learn the value of money; how hard 'tis to earn, how easy to spend. Tell him you have decided to pay him for certain duties; but that, like his parents, there are many, many duties he must perform with no expectation of visible remuneration—just as a member of the family, and with the consciousness that thereby he is contributing to the general welfare. I would urge you, too, to fix the wages at the price you would have to pay others for similar work; and then give him enough duties to earn, in the course of a year, an amount equal to what you have been in the habit of spending on his clothes, including shoes and stockings. Tell him that henceforth you expect him to buy these with his own earnings. Incidentally he learns to be careful of his clothes. Require him to keep a strict account. This gives him a good training in business, a correct idea of the legitimate reward for certain kinds of labor, and the necessary cost of part of our living. It thereby fortifies him against failure, right at the very point where our country boys are apt to fail. They go to town, earn a few dollars a week, and because they never before had the handling of money, they feel rich. Then follow trying, humiliating experience, when the *world is a hard critic*. Would it not be far better to let the child earn his first wages at home? Let him make his mistakes there, too, where loving eyes can watch him and tender counsel lead him into a better way!

In regard to purity, it seems to me that parents are most negligent.

I hold that the first lessons in purity should be that of the sacredness of the person. Our children, from their infancy, should be taught modesty. In some of our crowded country homes this is often difficult; yet if we realized its import, we would see to it that a little curtain is hung across the corner of the room, or the bed be pulled far enough out from the wall, and each child taught to dress there, *out of sight of his own brothers and sisters*. This

lesson of the sacredness, the modesty, of the person should commence with the babe in arms. How? By making it an inviolable rule that even these babes be clothed in such a manner that, if they were old enough to know, they would have nothing to blush for. They should always wear diapers. This is more than a question of convenience, of cleanliness. In their first months, to be sure, they are too young to be influenced by such a matter as clothing. Not so their brothers and sisters and the young of the neighborhood, whose ideals, high or low, we are thus helping to form!

I know many parents who have striven to inculcate obedience and truthfulness, and yet have let the question of purity take care of itself. The neglect of mothers in this matter is most dangerous. I have talked with some mothers, urging them to tell their children what they should know, and be met with the reply, "Oh, I want my girl, or my boy, to be innocent." I tell you that innocence that comes of ignorance is not safe, and will likely last only until tested!

There is a God-implanted desire in every child to know the facts, the laws regarding our existence, and our bodies; and a mother who keeps these from her children is wronging them as seriously as if she withheld from them the bread they crave.

If you are candid with yourself, you will acknowledge that when a girl, *you* longed to know the mysteries of life—sex relation and such things; and, if you escaped the foulness of knowledge obtained from impure sources, you have only God to thank for it. You know, too, that among your associates you could count on the fingers, likely, of one hand the girls who did not discuss these subjects and pry into these mysteries. It is foolish, it is foolhardy, then, to hope and believe that just because that girl is yours, she will prove a wonderful exception and be so pure, forsooth, as to escape the contamination of such information, received from impure sources.

The view a child has of the mysteries of life depends upon the manner in and the source from which she receives information concerning them. If they are first told to her in a pure, reverent manner, showing her that all these facts and laws came from God, who is purity as well as love, it will be well-nigh impossible for her ever to associate with them any ideas of vulgarity and impurity.

If you mothers value your sacred privilege of being the first to communicate this knowledge, and so jealously guard your right and *act on it*, your child will always associate it with you, who should be to your daughter the embodiment of purity. If, however, you let her find out these things for herself, she will, almost inevitably, seek the information from some wiser but impurer girl, or, worse still, from your colored cook or washwoman, most likely steeped in sin. I do marvel at any mother for so undervaluing the high office of motherhood as thus to relinquish her privilege in favor of any dirty-mouthed, impure-minded woman or girl who, as Satan's instrument, is only too glad to usurp that power over your child's future that you so carelessly, cowardly spurn. Ah! because your girl does not dare to break through the barrier that you have, by your silence, erected, you think she does not discuss these things with others? Then you have much to learn!

Do you say that you "*just can't* talk about these things to your child"? It is hard, at first, I admit; but if you truly desire and ask for Divine guidance in the matter, and earnestly and reverently approach the subject, striving to divest your mind of the false modesty that has surrounded it, *you can do your duty*. When, with your daughter in your lap or at your knee, and your loving mother arms around her, you have opened up to her the mysteries of her life and body, you will find that in the performance of that duty you and your daughter have grown tenfold nearer and dearer to each other. After that sweet confidence, accompanied by the assurance that *every* question she can bring to you shall be candidly answered, to the best of your ability, do you believe she can allow any companion to pour into her ear a garbaged, filthy version of the wonders of God's laws? She would resent any suggestion of the kind as she would the first breath of slander against you. I can only add, *Mothers, try it!*

We make another fatal mistake when we fail to keep before our boys the same high standard of social purity that we set for our girls; and what I have said about taking our sons into our confidence applies equally to our girls. In his earliest years, the mother can perform that duty for her boy as well as the father. As he grows, however, and matures, that boy is rich indeed whose father will unfold to him the wonders of this book. Alas! there is not one father in a hundred—I had almost said in one thousand—who is willing to undertake this difficult mission. So, if the father *will not*, the mother *must*! Hard as it is, she should do it, rather than let it be done in an impure way by some one else. If you, mother, feel that your knowledge is too limited to tell your boy *all* he should know, you might ask your family physician—provided he is a pure Christian man—to supplement what you have said. But you know enough to *open* the book yourself for him, and *do you do it*, even if you let your physician carry your boy deeper into its wonders.

At what age should this book be opened? For myself, I have always felt that I would rather be two years too early than one day too late! I would say, then, let your surroundings and your child's associates decide that; but do not be so foolish as to believe that some child or cook or laborer will fail to do what you are unwilling to undertake. As to surroundings, there is that about farm life that gives the child such suggestions of these mysteries that, if he is at all inquiring, make it wise to open the subject for him at, if anything, an earlier age even than for his town cousin. He almost unavoidably sees things that naturally cause his wide-awake mind to ask "Why?" and "How?" Unless, therefore, you deliberately break down that wall of reserve, he will almost inevitably ask these questions of the wrong persons. Strange propensity? Yes, *but true*.

A mother I know unfolded the first pages of this book to her oldest child when he was only four years old. She was led to this course because the child had early shown a desire to know the why and wherefore of everything, and because there were other children in the same boarding-house, and one of them had a colored girl for a nurse. The mother took her little lad into her confidence, and told him that these things were to be "kept as secrets between Jesus and him and her." If he ever violated her confidence, even by a glance, she never had the least occasion to suspect it. The questions with which he would come to her, when he could steal a quiet time alone with her, proved that she was his only source of information. The next child had an entirely different kind of mind; although to protect him from impure information from farm hands, she had opened the book of wonders quite early. Unlike his brother, he showed no curiosity, no interest even, in these things. So the book was gently closed, with the loving assurance that it would be opened at any future time the boy might wish. From time to time she touched gently on the subject, only to find that there seemed to be no interest whatever in those things. Always she assured him of an earnest desire that he should come to her with any question he might, at any time, wish answered. She always assured him, too, that she would never turn him away with a crumb of knowledge when he wanted a slice or, later, a loaf for his mental food. Years passed on, and that mother began to wonder if it had been in vain that she had so determinedly forestalled all other instructors on moral questions; and if it were possible that he had gained that information from other sources. She had many misgivings, until he was quite in his teens, and unusually late for entering puberty. Then for a whole winter he sought opportunities for confidential chats with her, and plied her with questions so deep and so numerous as to convince her that his mind was only then just waking up to that subject, and that it was a clean page on which she was privileged to paint, and give it any hue she chose.

If it has seemed to you that this talk has been in too serious a vein, it is because parents' shortcomings and the subject demand it. I have not intended to preach, but only to discuss with you our duties as parents, and the dangers and failures and burdens which are ours, in spite of the fact that no joys can

approach ours. These burdens are so well-nigh overwhelming that I feel about child-rearing as I do about sorrow-bearing: I do not see how any one can bear up under the weight of either without the Heavenly Father's help.

In closing, I would add—because I could not do better—the Apostle James' advice: "If any man lack wisdom, let him ask of God, who giveth to all men liberally, and upbraideth not; and it shall be given him."

THE COUNTRY HOME.

BY MISS LUCIE T. WEBB.

The country home! how peaceful, restful, and quiet is the very thought itself! Our mind's eye catches a vision of a cozy, comfortable home nestled among the oaks and elms, a broad green lawn in front with trees and shrubbery dotted here and there, wide piazzas with inviting rockers, hammocks, and swings that suggest rest and comfort. On the inside of the home we see every evidence of neatness, refinement, and culture. The few pictures that are artistically arranged on the walls suggest noble and inspiring thoughts. The usual assortment of bric-a-brac and dust-catching receptacles have given place to vases of fresh cut flowers that lend fragrance and beauty to every room. No repulsive fly papers and fly killers are in view, for the tight-fitting screens keep out flies as well as mosquitoes.

The whole house is filled with a cheerful, cozy atmosphere, but by far the most attractive and restful place is the "Living Room"—the gathering place where the members of the family have spent so many happy hours in each other's company. Here we see the signs of the inner life of the home—father's easy chair, mother's work basket and fancy work, and the children's play-things in their corner.

Many more things we could add to the picture of this ideal country home, but we have seen enough to convince us that there is no place like the country. Here nature has put many things close at hand to make us happy and contented if we will but see, use, appreciate, and enjoy them. Grass, flowers, trees, birds, are all to cheer our hearts and keep us ever mindful of the beauties of nature; while fruits, nuts, and vegetables of all kinds satisfy the cravings of a healthy appetite. You say it takes work to have all of these things! Indeed it does, and there's where the secret lies. Are we not happier when we are occupied? Isn't the sweetest rest that which comes after an honest day's work? Do we not appreciate more fully those comforts which we have attained through our own labors rather than through the efforts of some one else? Then let us *do our best to have* an ideal home. Consider beauty and pleasing effects inside and out. Remove all of the barrels, boxes, and rubbish, for these give the place an unkept air. Clip the weeds off and let the grass grow; plant a few flowers in a rich, sunny place, and a vine or two to run up on the porches to brighten the looks of the old house. Whitewash is an inexpensive thing, yet how much it adds to the looks of a place to see the outhouses, the posts and fences, all shining in the sun; and a man with a hand sprayer that costs only a few dollars can whitewash all the buildings on an ordinary farm in a short time.

The responsibility of the home of course rests with the mother, and one can often look into her toil-worn face and see that it isn't her fault that things are not kept neat, clean, and attractive. All of her strength has been used up in doing what she considers the "necessary things," and she hasn't had the time nor the will power to give the little touches here, there, and everywhere that show unmistakable evidence of a woman's art. She naturally loves pretty things, and the care of flowers, the making of downy cushions

and dainty pieces of embroidery for the home is not a task, but a pleasure, to her. Yet the mother's strength does not permit of her doing *everything*; so frequently these little touches have to be left undone.

In order to keep her home so that it will be a delight to herself and a pleasure to others, the mother must make a *study* of the *saving of steps, strength, and time*. She must "cut off the corners," as it were—make one step answer for many, and one lick do the work of two or three. In this way she may save enough time to enable her to do the housekeeping as it should be done. We might suggest a few things that would help her in this, and by adding them one at a time the expense would not be so great after all: A convenient water supply comes first; then an oil stove and a fireless cooker; linoleum on the kitchen floor would save many, many hard licks; a sink fixed in one corner of the kitchen table with a pipe to carry the waste water away from the house is a convenience that is found in a few country homes, yet it costs very little, and will save hundreds of steps in a day; while countless numbers of steps might be avoided by having a place fenced off for the garden close to the house. Conditions are not the same in every home, and the housewife will have to study out many of these problems for herself, and when she makes a real study of her housework she will grow more and more interested in it; and as soon as she learns to do it in a systematic way she will be astonished at the number of steps she is able save herself, and the great amount of work she can accomplish with the same strength and in the same length of time.

The always-tired mother must look at this question from another standpoint, also. When she uses up all her strength day after day and goes to bed at night too tired to sleep, her nerves and her whole physical make-up must suffer. Consequently the daily cares, trials, and disappointments that come into every one's life, which by accepting and overcoming in the proper way would sweeten her disposition and ennoble her character, will, on the other hand, make her peevish, cross, and disagreeable—not because she chooses to be so, but because she can't help it. Consequently, in her efforts to make a home she fails *completely*, for the very best in home life is impossible without forbearance, kindness, and unselfishness. If we find an irritable, fussy mother, the children will imitate the spirit and will develop fussy, disagreeable dispositions; and when the father and mother cannot agree, one need not expect anything but disagreement in the children.

After all, there must be contentment at any price. It is not possible for every one to have a beautiful home; but even the poorest, in the simplest little hut, can have a *happy home*. The real home is in the heart, and that must be filled with love, kindness, unselfishness, and a proper consideration for others, before we may have the real "*Home, Sweet Home*."

HEALTH HINTS.

BY MISS KATHARINE PARKER.

In this discussion I shall not endeavor to enter into a detailed account of how to acquire health or to maintain it. The time is inadequate for a lengthy treatise on this very important subject, a theme which should stand first in our list of subjects for consideration. Therefore, as the title, Health Hints, suggests, I shall endeavor to touch on it in a way that will bring it to our attention, and I hope cause us to pursue it further in the quiet of our homes.

Upon the women of the home more than any one else rests the responsibility of the health of the family, and for that reason she should give the subject careful consideration and acquaint herself as fully as possible with the laws governing health. The happiness and welfare of the entire household depend largely upon her knowledge and enforcement of these laws. Yet with this

great responsibility her work is not always appreciated as it should be—often not even by herself. Perhaps this can be illustrated by the following incident related at an Illinois institute and which probably has a parallel in the experiences of some of you. Who of you has not often heard the mother of the home say she was not earning any money, in this way speaking disparagingly of her own important work?

A man chanced to meet a certain boy who was unduly proud of the fact that he was earning regular wages and supporting himself. He entered into a conversation with the boy, which ran something like this:

"Yes," said the boy, "I make \$3 a week; Mary is in the store and she earns \$5; I don't know how much father earns; and Ted and Jim, they don't earn anything—they just go to school."

"And do you board at home?" asked the man.

"Oh, yes; we eat breakfast and supper there, and mother puts up our dinners for us."

"Yes, I see; who gets the breakfast and does the other cooking?"

"Mother."

"Who washes for you?"

"She does."

"Do you keep a girl?"

"No, we don't need one. Besides, we couldn't afford one, anyhow."

"Does your mother do all the work for the whole family?"

"Why, yes, of course."

"Does she sew and mend for all of you, too?"

"Well, I should say she did. We never hire help for anything."

"You say you get \$3 every week and Mary \$5. What does your mother get?"

"Mother! Why she don't work; she just stays at home; she don't get anything."

The mother's services were evidently necessary, but no money value was placed upon her work. It was taken as a matter of course that she should be cook, nurse, sew and be a regular Jack at all trades and good at all. The woman has a great, God-given responsibility, when the health of a family is placed in her hands.

In the consideration of this subject some of the essential things are the relation of air, water, foods, cleanliness, and rest to our bodies.

Air comes first, because without it we can live only a very few minutes. Our lungs need pure air all the time. If we are content with shallow breathing, we are content to have poisons in our bodies. In the lungs there is an exchange of oxygen and of waste products between the air and the blood. When we breathe just from the chest, the blood in the lower part of the lungs has to go back to its work without a sufficient supply of oxygen. Besides, we have to keep all parts of the lungs exercised to keep them in working order, so they can resist attacks from consumption and other lung diseases. There is a right way to breathe and a wrong way. Naturally, we breathe through the nose; but if this passage is blocked, we are forced to breathe through the mouth. Almost always mouth breathing in children is caused by the growth of adenoids, a superficial growth of the mucous membrane. Many evils follow in the wake of adenoids. The air gets to the lungs by a shorter route, therefore it is not so well sifted by the minute hair-like projections in the nasal passage, and does not have the same chance to reach the body temperature. The child's face becomes deformed, and has an unnatural shape, and often the child becomes partially deaf. In later life asthma is likely to develop. So just as soon as you notice that your child breathes through the mouth habitually, take him to a physician for examination.

Adenoids are not new-fangled, but are as old as asthma; but thanks to medical science, they can be eliminated. We want the children to breathe properly, as Nature intended. The air we breathe is about one-fifth oxygen. In breathing we extract part of the oxygen from the air and give out carbonic acid gas in its place. This gas is a deadly poison to our bodies. So we

see without a free circulation of air day and night, in an occupied room, it soon becomes foul and unfit to breathe. A lamp will not burn in the presence of too much of this carbonic acid gas. If I breathe gently into the holes of the burner of a lighted lamp, the flame dies down. And thus the flame of life in our bodies dies down when we breathe the same air over several times.

Some of us want pure air in the daytime, but just as soon as the sun goes down, we are afraid of it, and close all the windows. There is nothing in night air to make us afraid of it. It is usually cooler, so perhaps we need more clothing during the night hours. Then, winter and summer, let's throw our windows wide open at night so we can be refreshed by the pure air.

We are starving our bodies of *water*. The whole system needs water to carry on its work. The average person needs at least eight or ten glasses of water a day. Do we drink that much? Lack of water causes constipation, and this disease is the root of many others, including appendicitis, most probably. A large quantity of water is carried from the system through the kidneys and through the skin, and this must be replaced. Water is the one medicine I recommend to you, unreservedly. It is God's pure medicine. Let's take it instead of the patent medicines, which are often man's impure frauds. Our bodies call for water inside and outside. The skin is covered with oil glands and sweat glands. It is estimated that we have 2,500,000 of the latter. If these become clogged, they cannot carry on their work of removing waste from the body. They can become clogged by their own secretions, with dead skin, with the oil from the body, or with dust. It is a very easy matter, however, to keep these pores open, simply by bathing, frequently and regularly. Not only are the pores of the skin filled by these excretions, but the pores of our clothes also. So this makes the frequent airing of our clothes imperative. Those we wear in the day must be aired at night, and those we wear during the night should be aired in the day. We should give our bodies a chance to air; the pores need to breathe, so to speak, and it is criminal to keep them wrapped in the same garments day and night. In the summer especially, our underclothes must be changed frequently. This does mean hard work. A week's washing and ironing these hot July days is no easy thing. But these dead cells and poisons must be taken out of our clothing, if we are to have bodies strong and capable of resisting disease.

While speaking of clothing, I want to make a plea for rational clothing. The real purpose of clothes is for protection. It is all right to follow fashion so long as it does no harm, but when it tells us to wear things which are injurious, we must say *no* firmly. Some women are blind enough to follow, no matter if it says bind the feet, bind the waist, heat the head with artificial hair, wear heavy skirts which pull on the hips and drag in the dust. We do not want to be conspicuous because we do not conform to fashion, but we must have minds of our own and say, "Thus far and no farther."

Foods and digestion play an important part in health. A good digestion is something to be proud of, but don't work it to death just because it is good. The first important process of digestion begins in the mouth, with the digestion of the starches; therefore, we must masticate thoroughly so that the saliva will be well mixed with the food. Since the mouth plays such an important part in our health, careful attention should be given the teeth. If the child's teeth are well cared for by a good dentist until he is sixteen or eighteen years old, it is probable that he will have good teeth all his life. Food is necessary for growth, repair, and energy; therefore the elements composing the body must be found in the food. Most foods are formed from some of the thirteen fundamental elements, and all must undergo chemical change in the body before being utilized by it. Protein foods include meats, milk, cheese, eggs, peas, beans, etc. Its chief office is to build and repair tissues. Proteins furnish energy, but at greater cost than carbohydrates and fats.

Carbohydrates are found chiefly in vegetables, fruits, cereals, and sugars. They maintain heat and furnish energy. Each starch grain is surrounded by

a denser layer. This must be burst, so that the saliva can get at it. So all starchy foods, such as cereals, breads, legumes, etc., must be cooked long and thoroughly.

The cook stove is a wonderful blessing, but we misuse it at times. There are many foods which we cook elaborately which would be just as wholesome raw. We mix too many things, and have too many fancy things. As a rule, the more simple the cooking, the more likely the food will have its value increased from a health standpoint.

It is a significant fact that while science is rapidly gaining the conquest of the majority of contagious diseases, at the same time the diseases due to errors of diet and nutrition are enormously on the increase.

The daily average food of an adult is about $4\frac{1}{2}$ ounces protein, 2 ounces fat, 18 ounces starch, 5 pints water. Authorities agree that a mixed diet is best, although some are trying to decrease the protein standard. It is very necessary to have the proper amount of protein every day, but an oversupply is injurious. It should be properly balanced with the other foods. The starches, fats, and sugars have been compared to the coal that feeds the locomotive; the proteins represent the iron and steel that are used to repair the engine and to replace the worn parts. The protein leaves ashes, and these are known as urea, uric acid, etc., and they probably have more or less to do with various diseases of the body, rheumatism, etc.

If we conform to these rules our bodies will be fortified against disease. However, there is an old saying that "All work and no play makes Jack a dull boy." This is a hard lesson for the housewife to learn. How can she find time? With the cooking, cleaning, churning, washing, mending, and tending to the children, where is there a spare minute for change of occupation or change of scenery? If you will think of your acquaintances, I imagine you can recall some one who does not leave home one day out of a year, or possibly out of five years. The nervous system demands occasional periods of recreation and diversion. These will more than repay for the time they consume, and not only make life happier, but will probably save in doctors' bills. Unless there is some kind of recreation, *worry*, that dreadful foe, will come in the household, and of all diseases this is one of the worst, because it lasts longer.

Sleep is one of the essentials of rest. It is the time in which our bodies and minds are refreshed, and we must not interfere with this time. When you go to your bedroom, leave every worry behind. If anything has gone wrong during the day, drop it absolutely with the work. An occasional hour may be lost safely, but there will always be a penalty for persistent robbing of the sleep which nature calls for.

If we are inclined to worry, we will have to fight against it. "The secret of self-treatment of worry is the cultivation and acquirement of self-control." Determine to control yourself. Summon all your mental decision, moral resolution, and spiritual help. Some of us do not worry about our daily work, we know it is progressing all right; but how about to-morrow? Possibly we may think we may need rain to-morrow; but will our worrying make rain come? This reminds me of a little verse I found several years ago:

"Build a little fence of trust around to-day, and therein stay. Look not through the sheltering bars upon to-morrow. God will help thee bear what comes, of joy or sorrow."

If we have done absolutely the best we can, we need not worry; or if we have not done our best in the past, worrying will not mend matters; but let us determine to live up to the mark in the future. So we see that good health and happiness go together. No one bubbling over with good health can be anything but happy. Be enthusiastic about your work, about your husband's work, and your children's work. We owe it to ourselves, our families, and to our God to be healthful and happy, to make the very best out of these bodies and minds which have been given us, and to hand down to future generations the rich heritage of a sound mind in a sound body.

A TALK ON PATENT MEDICINES.

By MRS. W. N. HUTT.

Ladies, I am going to talk to you to-day about a subject which many of you may have considered very seriously or may not have thought of at all—that is, Patent Medicines. Practically all of them are, according to the American Medical Association and the United States Government Bulletins, harmful, and are deceptions, frauds, fakes.

Patent medicines are mixtures of various flavors, drugs, and simple substances, their object being to so beguile the public into thinking they will cure, that it will buy them, and thus dollars will be transferred from the pockets of the purchaser to that of the manufacturer.

Why *do* we buy them? Goodness knows. I do not, unless it be, as Barnum said, "The people like to be humbugged." Go into any drug store and see the shelves. On one side are the scanty drugs for prescriptions, on the other the shelves are crowded with patent nostrums, many of which, the label informs us, will cure anything from bunions to earache. That in itself should make us doubtful of them! Not so, however, for their sale continues.

And who buys them? Men and women? Yes, but mostly women; more than that, mostly country women. Some time ago I talked with an agent for Black Draught and Wine of Cardui, and he told me that it is the little country stores that are by far his best customers. When I made the remark that I hoped the Farmers' Institute, farm papers, etc., were educating people against them, he said: "It would seem as if they should, but our business last year was 18 per cent more than it was the year before." Ah! what a travesty on the intelligence of our people! I said: "What do you suppose ever made it so?" "Oh," he replied, "we advertise so much." Yes, and there is the pity of it. We women are paying for most of these advertisements. Take any average county newspaper, and cut out the patent medicine advertisements, and what have you left?—a thing of shreds and tatters, a sieve.

It would not be so bad if the only result was the loss of the money that should have sent Mary to school, bought Johnnie a new coat, or paid the mortgage on the farm. The pound of flesh is taken also, and that pound of flesh is apt to be the presence of real maladies where only simple ailments existed before.

The average person drifts into the patent medicine or "dope" habit unthinkingly. Mrs. Jones will have a headache. It may be caused by anything from indigestion to pressure on the spine; but she will say: "John, when you take the eggs to market to-day, get me a bottle of headache medicine," which he does. It may be Orangine, Bromo-seltzer, Royal Pain Powders, Capudine, Antikamnia, Phenalgine, or any of several others. They are, according to the American Medical Association, subtle poisons, usually in the form of acetanilid, which, instead of "strengthening the heart and producing better blood," do in fact thin the blood and finally undermine the whole system. Those who habitually take any of these remedies suffer from anemia. I could give you the names of a large number of people who died of taking headache medicines.

John himself, perhaps, has a pain somewhere—anywhere in his body. He wants something to cure him and is willing to pay a dollar for a bottle of relief. His glance wanders over the shelves, and Peruna, Paine's Celery Compound or Hostetter's Bitters, Lydia Pinkham's Compound or Swamp Root catch his eye. He takes one of them, and after the first dose he feels amazingly better. Surely he does, but he could have obtained a bracer cheaper and purer at the nearest saloon. If the husband of any one in this audience, especially if she were a W. C. T. U. worker and he a church elder—if he stood up before the bar and drank a glass of whiskey, the wife would feel aggrieved for the sake of his example if not for the harm of it physically. Nevertheless,

whiskey—alcohol—is in these things. Pure bond whiskey is only 50 per cent alcohol, while Hostetter's Bitters is 44 per cent, Peruna 28 per cent, Paine's Celery Compound 21 per cent, etc. Many are the cases of drunkenness resulting from the innocent consumption of these nostrums.

A few months ago I was visiting in a house where the subject of patent medicines and patent drinks such as Liquozone, Koka-Kola, etc., came up. I deplored their existence, and a spark of life came into the sick, tired face of the hostess as she roused herself to say: "Why, the idea! I have taken them all my life and they never hurt me." "Never hurt me!" Poor, deluded little woman, just out of a sanitarium, nervous, hysterical, desiring—ever desiring—she knows not what—the victim of habit-forming drugs.

If you have never tried a patent medicine, the next time you have a pain take a dose of some kind—any kind. In a few minutes you will feel better, and will say, "Surely, this is most excellent stuff I have taken into me." Assuredly, yes. The whiskey in it has been a bracer, the strychnine has stimulated temporarily the action of the heart, and morphine or some other derivative from opium has deadened the pain. Notice that I said "deadened." The pain and the cause of it are still there. Pain is the cry of the body for repairs.

Having begun the patent medicine habit, dollar after dollar buys other bottles of the stuff. The doses as they lose effect grow bigger and bigger until the medicine gives no apparent results. Another and another medicine is tried. A druggist told me a short time ago that a man came into his store one day and said, pointing to a bottle in a blue wrapper, "I think I will get a bottle of that. I've tried most of the others."

The drinker of patent drugs sends for a physician, only to learn that the nostrums which were supposed to cure the kidneys had injured the heart, or, taken for the liver, had produced an irritation of the bladder, and that in any case he was a nervous wreck. Possible temporary relief, but not cure, was the only thing that could be given him. Rest assured, if the physician who knows you, who sees you, probably loves you, who lives in your midst and will have to bear the stigma of not having helped you—if he cannot cure you, be certain that no man a thousand miles away can do it. All he cares for you is your money. He demands cash payments. You cannot put him off until crops come in. Do not be his victim!

Consumption and most cold cures are frauds, pure and simple. Some of them, such as "Phosphozone," contain only creosote and sugar. Others, such as Tuberculozyne, Piso's Consumption Cure, and many others, contain some form of opium, which dulls the patient's perceptions. The cough, which is the God-given method by which to rid the body of some of the germ-laden tubercles and sputum, is stilled. Thus the germs multiply and undisturbed destroy the body's tissue. Consumption, taken early, can be cured, but not by medicine. Nevertheless the patient who dies thus slowly is willing and eager to give any quack his last dollar for a ray of hope of life.

Lastly, "Cancer Cures" are another blatant fraud. They are composed of such things as clay, glycerine, salicylic acid, and oil of wintergreen—a treatment that *Collier's Weekly* informs us "would not remove a wart or cure a mosquito bite."

Thus it is through the list of ailments to which flesh is heir. There are quacks for all and "cures for more diseases than the assembled physicians of the world ever heard of," from Cobb's Catarrh Remedy with its cocaine, to that method where the man cures various things, usually eye and throat troubles, without a knife, preferring to use scissors. Do you not suppose that if they had anything wonderful, the medical fraternity would not have learned it? Do you not feel that Dr. "Quackem" would be a villain indeed if he alone did know of something that would heal a suffering people and that he did not give to the world! Few of these medicines are ever made by physicians or chemists. To be sure, they call themselves such, but that does not make them so.

Great as may be the crimes of an adult against himself or herself, they are not to be compared to the unforgivable culpability of the person who gives the "baby killers" (U. S. Bulletin) to defenseless little children. From Mrs. Winslow's Soothing Syrup to Victor's Infant Relief, they one and all contain morphine, codein, heroin, opium, chloroform, or cannabis indica. They soothe only because they contain dope, which deadens the brain, and sometimes the baby sleeps never to awaken. The child who is given a soothing syrup is being prepared to become a cigarette fiend or, more likely, a dope fiend. There is a notable case on record where a mother gave soothing syrup to two of her children in infancy; then, learning of its danger, she abandoned its use. These children in middle life became neurotics, spirit and drug takers. Three children born later and given no drugs grew up strong and healthy. The American Medical Association in its Journal asks, "How many neurotics, fiends and criminals may not 'Mrs. Winslow' be sponsor for?"

"But," might well be asked, "why do not the newspapers publish this?" Because over \$40,000,000 are paid to the press every year for advertising, more than \$1,000 to each daily, weekly, and monthly in the United States. One firm, the Lydia E. Pinkham Company, pays \$1,200,000 a year and Dr. Pierce and the Peruna Company pay even more.

More than that—across the face of every patent medicine advertising contract are the words in red ink, "It is agreed in case any law or laws, either State or National, harmful to the interests of the patent medicine companies are enacted, that this contract may be canceled by them from date of such enactment." A shrewd scheme to muzzle the newspapers. So silenced are they that when on several occasions legislation against patent medicines was being discussed, the papers omitted for the day "the news of the House." Immediately, your indignation arises against these papers. They may be to blame, but if so, we are doubly guilty. Why are we not more alive to the enemies of our household? There are sources of information other than the papers.

There exist a few publications that are honest enough to speak the truth, and among them we are proud to say is our own *Progressive Farmer*. Government Bulletins, the *Ladies' Home Journal*, *Collier's*, and other magazines have warned us well if we would but read the warning. Physicians realize the evil, but their hands are tied, because if they warned us we would misjudge their motives.

The solution of the whole problem, then, is Education. When we give our boys and our girls such common-sense lessons in practical physiology as they should have, they will grow up alert to the body's enemies. They will know that any medicine can act on the body only by being carried by the blood through the body to the living protoplasm of the cells, and that it is reckless indeed to take in among them without the advice of a physician anything whose action they do not understand.

We Americans are shrewd enough when it comes to buying a horse or a cord of wood, but when it comes to buying back that most priceless possession in all the world—health—we are gullible indeed, believing the statements of shysters, promoters, frauds, with absolutely no credentials to honesty other than their own doubtful word in some well-paid publication.

Many patent medicine advertisements are not fit reading for young people, sounding as they do the depths of all that is suggestive. Some of them would bring a blush to the cheek of a roué. It is time we considered these things and encouraged the papers that endeavor to sacrifice for the truth, debarring all others. Particularly have we reached the time when we should demand of our religious papers clean, true advertisements—which patent medicine ones certainly are not. They should stand for decency and for the welfare of the home at any cost. You can afford to do without a religious journal until the editors comprehend that you care more for truth and principle than for their prosperity.

When that day comes in which the intelligence of the people is greater than the unscrupulousness of patent medicine manufacturers, then will they cease to be chronicles of disgusting symptoms. Legislation against them will be sure and swift, for our legislators are of our choosing.

Since patent medicines are injurious to the cells of which the body is composed, and since health is the foundation of all prosperity and happiness, let us not only keep the nostrums outside our homes, but let us do what we can to enlighten others as to their dangers.

Every life has a value in dollars and cents. Every life has a value that cannot be measured in dollars and cents. I speak conservatively, therefore, when I say that bringing about the abolition of the poisons, frauds, and fakes from our land is a cause worthy of our thoughtful activities. One honest druggist in Chicago displayed a sign in his window which read:

PLEASE DO NOT ASK US

ANY OLD

What is PATENT Worth?
MEDICINE

For you embarrass us, as our honest answer
must be that

IT IS WORTHLESS!

If you mean to ask at what price we sell it, that
is an entirely different proposition.

When sick, consult a good physician. It is
the only proper course. And you will find it
cheaper in the end than self-medication with
worthless "patent" nostrums.

Can you not convince your druggist to do likewise?

HINTS ON SAVING TIME.

By MISS MINNIE L. JAMISON, STATE NORMAL AND INDUSTRIAL COLLEGE.

I have come to you this morning in the hope that by an exchange of ideas we may be able to do better planning in the home, and by thought and system be able to save time for the development of our higher natures—time for reading, meditation, and for exchanging ideas with those around us.

There are two classes of home-makers in the world to-day. In one class the work is well planned and carried out. The woman in charge of this home knows the value of planning and system, and she works to a successful issue in every detail. On the other hand, her neighbor may work apparently much harder and accomplish far less, because she works without a plan. You may be mentally asking, "What does she know about work on a farm?" I am glad to say that I have spent more than half of my life on a farm in Rowan County in this State, in the days, too, when farmers were not so progressive.

No profession has made greater progress in the last two decades, and I rejoice with you in it. You, as wives, have your share in this progress—all these years you have coöperated with your husbands, and by sympathy, support, and economy have helped to equip the farm with the best modern implements in order that the old farm might yield its best results. This is right. Coöperation is the keynote to happiness and success; but coöperation must not stop with the farm. It is your turn now to have the labor-saving devices in the home to help make progress greater on the farm. We know that when peace, quiet, and happiness reign in the home, the same *good feeling* exists all over the farm. If the head of the house starts to his day's work with his body well nourished by good, wholesome food, and his mind filled with peaceful, tranquil thoughts, his day's work is going to be a satisfactory one—if not an enthusiastic one. How can we keep this state of peace and sunshine in the home when there is so much to be done? I answer, it can be kept by saving your physical strength—that is, by planning your work, and by the expenditure of a little money for the labor-saving devices to keep you, as you deserve to be, fresh in mind and body.

In order that you may see how you may save your energy and strength, I have brought with me a box—a heat conserver, more commonly known as a fireless cooker—which I had built at the small cost of about \$2.50, not counting the mechanic's labor. It is so simple in mechanism that a child can understand.

PLAN OF BUILDING.

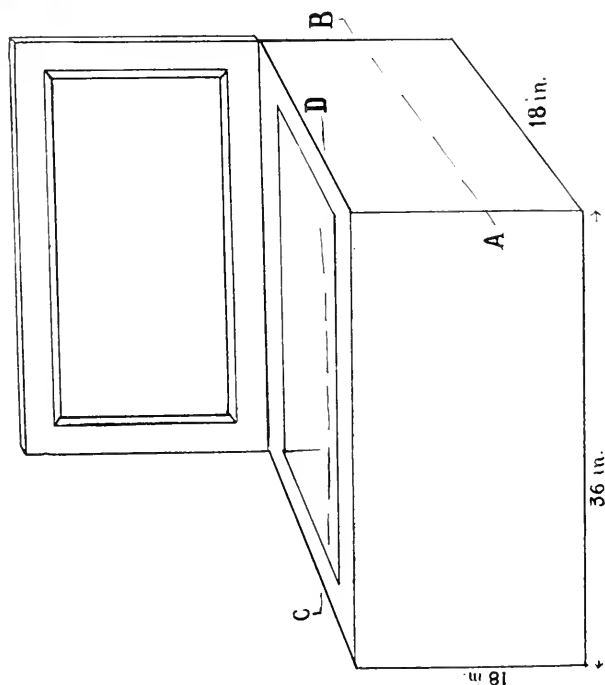
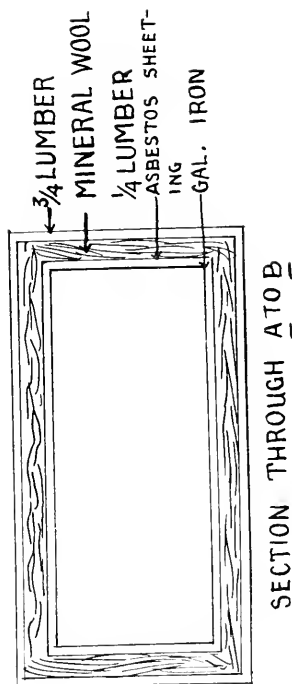
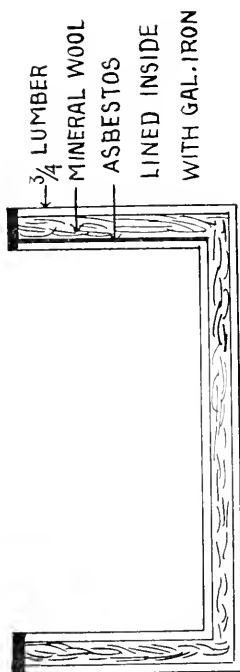
1. The outer box, marked 1 in the cut, is built of good, heavy $\frac{3}{4}$ -inch lumber.
2. The vacuum, marked 2 in the cut, is a 2-inch space, filled with mineral wool or asbestos and magnesia.
3. The division, marked 3, is the inner box made of 1-inch lumber.
4. Asbestos sheeting of good quality is used to cover bottom, sides, ends, and lid.
5. In order that the box may be kept clean, the inner surface is lined with galvanized iron.

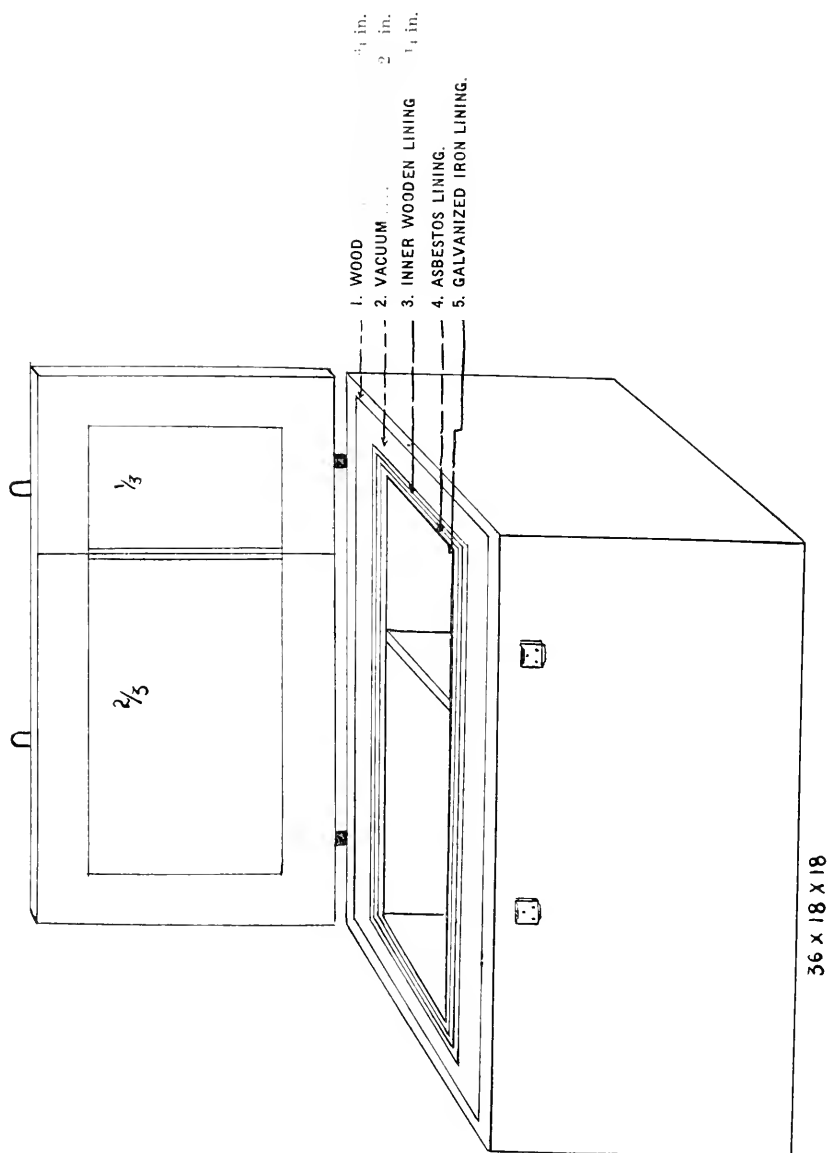
PLAN OF HEATING.

In the country, where it is impossible to have the convenience of the city kitchen, the housekeeper, by thinking and planning, can save a great amount of hot, hard labor and fuel by heating the ordinary chimney brick or soapstone during the time the breakfast fire is burning, or in the winter they may be heated in the open fire. A small alcohol stove or a blue-flame oil stove is a great convenience in the summer; especially is this true when brick are used for fuel in the box, as they do not hold intense heat as long as the soapstones. A universal alcohol stove, one burner, costs about \$3, and burns about 2 cents worth of alcohol per hour if well regulated.

DEMONSTRATION.

In order to do a good day's work we must think ahead. If we are to have several vegetables from our garden for dinner, we should gather them in the cooler part of the day before we wish to cook them. While the breakfast fire is burning in the range the fuel may be heated for the box. When breakfast is over, put the dishes in a pan of cold water and leave them until later. Prepare the dinner vegetables, soups, meats, etc., and place on the hot brick or soapstone in the box, and keep the box closed until it is necessary to open it. After this is done, the dishes will wash easily and with plenty of boiling water to sterilize them, the drying and polishing will be quickly done. If work is planned in this way the cleaning in the average household will be done by 8:30 or 9 o'clock, and the remainder of the morning is yours to use in the various needs and pleasures of the home until it is time to serve the dinner. If we wish beans, potatoes, and okra for dinner, and we have no aluminum boiler with a tight cover, we can use a clean bucket or can with a tight lid on it, and by using just enough water in the can to form steam all of the vegetables may be cooked in the one vessel on one brick. If strong





vegetables, like onions, are to be cooked, they may be put in a small vessel with a tight cover and placed in the large vessel with the other vegetables and all cooked on one brick or soapstone.

Our farmers need good food with staying qualities, and their appetites call for pies. Instead of making four, six, or eight pies, as some of us have done, let us save time, labor, and fuel, as well as digestion, by using a large pan which will hold the quantity of fruit necessary for the family. Make a bottom and top crust, if you will, but a better plan still is to put the fruit in the pan without a bottom crust, and if the fruit is juicy, put a cup, mouth downward, in the center of the pan to act as a *vacuum* for the juice: then sweeten to taste, cover with a top crust and bake from one to two hours between the two hot brick. The time for baking in the box will depend upon the fruit. In this case, both time, labor, and fuel are saved.

In the matter of canning vegetables a great amount of hot, hard labor is saved by the use of the box. For example, after the vegetables have boiled fifteen minutes under steam and are made air-tight, quickly place the vessel holding the jars in the box on a hot brick. At the end of twenty-four hours the vegetables may be reheated, as a matter of safety, and again placed in the box. This method saves hours of fuel and is a means of keeping the kitchen cool.

RECIPES.

For vegetables, the recipes that apply to the range will be satisfactory when used in the box, except in the case of water. Since there is no evaporation, all vegetables, except those to be drained and those that absorb water, must be cooked in very little water—just enough to produce steam.

The time for cooking vegetables in the box is about the same as that required on a range.

SNAP BEANS.

Allow the usual piece of bacon for the seasoning. Put the bacon in about one cup of cold water, add salt and bring to the boiling point on the breakfast fire. Add two quarts or *more* of beans, cover with a close lid and place on a hot brick in the box. Allow about four hours for cooking. If too much water is used the beans will not be good.

SQUASH.

Cut the squash into halves or quarters, remove seeds with a small sharp knife, and steam over beans or other mild vegetables. When tender, remove skin and season with salt, pepper and butter.

OKRA.

Cut stems from tender okra and steam over any mild vegetable; when tender, season with salt, pepper, butter and a little good vinegar.

If okra is cooked over beans very little seasoning will be needed.

ONIONS.

Put onions into cold water to remove skins. Drop them into boiling, salted water, cover closely and put in the box on a hot brick. When tender, drain and season with salt, pepper and butter.

PEAS.

Put the usual seasoning of bacon in cold water, add salt and bring to the boiling point. Put in the peas, cover closely, and place in the box on a hot brick or soapstone. Allow about four hours for cooking peas.

TO STEAM A ROAST.

Try out the suet, put the roast in the hot fat, sear on all sides, cover closely and put in the box on a hot brick. When ready to brown, add salt, pepper, flour, and one-half cup of boiling water and cover with a *hot* soapstone.

TO STEAM CHICKEN OR TURKEY.

Pour one cup of boiling water on the fowl, add salt, pepper, and a little butter, cover closely until tender. The time required will depend upon the age of the fowl—about as long as the time required on a range.

In making salad for a banquet for four hundred and fifty guests, the chickens were cooked in clean, ten-gallon cans with close lids. The time required for them to cook in the box was not over three hours and a half, with the expenditure of about twenty or thirty minutes' fuel in heating the discs or bricks and in bringing the water in which they were cooked to the boiling point—making a saving of three hours in fuel.

Caution.—Care should be taken to *remove meats* from *any* fireless cooker *while hot*. If allowed to cool in the air-tight box there is danger of ptomaine poisoning. Especially is this true of chicken.

BOILED HAM.

Wash the ham, put on in cold water sufficient to cover. Bring slowly to the boiling point and boil until the ham is hot through to the center. Cover closely and put in the box on a hot disc. It will require about as much time to cook a ham of ordinary size in the box as on the stove. If a brick is used for fuel, the ham may have to be reheated, since brick do not hold heat as long as soapstone.

To bake in the box two hot soapstones are necessary. Bread cooks in the steam, but if there is much steam the bread will not brown until the lid of the box is opened to let out the steam.

The tests are those used by our mothers and grandmothers in baking bread in the skillet. Sprinkle flour on the stone and if it browns quickly it is sufficiently hot; if the flour burns, the soapstone is too hot.

BAKED PEARS.

Use very little water, since the fruit is such a large part water. Add sufficient sugar to make jelly form in the pan—about one-half a cup to eight pears. Flavor with slices of lemon and a little stick cinnamon.

When soft, tender fruits are baked, only one hot disc is necessary. The rich baked taste is the result rather than the insipid taste which often results from stewed fruits.

ROLLS.

When rolls are double their original size, place the pan in the box between two hot soapstones and leave closed twenty or thirty minutes. Then open the lid of the box to let out the steam, quickly rub butter over the tops of the rolls, and close. The bread will brown before the steam collects again if the stones are sufficiently hot in the beginning.

If *curiosity* forces you to open the lid several times, the crusts of the rolls will be tough instead of tender.

The *packed rolls*—those closely placed in the pan—baked in the box are superior to the same baked in the oven, because, being cooked in steam, the center of the roll is better baked and of course is more digestible. Neither, however, is quite so good as the pocketbook roll thoroughly baked in the oven.

CAKE.

For loaf cake the box is excellent.

REMARKS: The box may be packed with any of the nonconductors, such as sawdust, cotton-seed hulls, paper and hay, feathers or mica; but the time required for cooking will be longer than that given in this paper because mineral wool or asbestos and magnesia are the best of the heat-holding materials. The drawing was done by a student in the Department of Household Economics. The building was done by F. E. Ralledge, the college mechanic.

THE SCHOOL LUNCH BASKET.

BY MRS. F. L. STEVENS.

The school child demands for health and efficiency, food, open air and exercise. The schoolroom affords none of these, hence the importance of supplying these necessities from outside sources. The hygienic condition of the schoolroom may be better than some of the homes of its children, but it is always worse than that of their play-places which they make of their own choosing.

Food, wisely selected, properly prepared, is a matter of chief importance to the growing child. The problem of the midday meal at school is no end troublesome to the careful mother who constantly asks herself the question, "How can I provide a wholesome, attractive meal sufficient in quantity, yet good to 'study on'?" There are still other questions that the watchful mother asks: "Where are the lunches stored before eating time?" "Are they kept in the cloakroom with wraps, umbrellas, and hats?" "Where and how do the children eat their lunches?" "Do they eat with unwashed hands at the desks at which they have been sitting throughout the morning?"

The answer to the first question, "What constitutes a good lunch?" is in a measure the answer to the larger question, "What constitutes a good meal for a child?" Some one has said that a well-put-together meal should contain something starchy, something meaty, something fat, something fibery, something sweet, something savory, and something liquid. When we consider the space of the ordinary lunch basket, it would seem that its capacity would be taxed to overflowing by this combination; but foods representing this grouping may be properly combined in a very simple school lunch.

The basis of every good meal, school lunch or any other, is a good, wholesome, thoroughly baked bread. Cold soda or baking-powder biscuits, or cold, soggy bread in any form is bad for any one, and it is particularly bad for children. The long, narrow, crusty light roll, well baked, as well as the beaten biscuit, will prove an appetizing substitute for the sliced light-bread. Remember the children on baking day, and make some of these finger rolls for the school lunch.

The meaty or tissue-building part of the lunch may be provided in the form of milk, eggs, cheese, fish, poultry, nuts, meat, beans, or field peas. Milk provided in a little bottle or curd in the form of cottage cheese; eggs, hard-boiled, served whole or minced and mixed with salad dressing to form the filling for a sandwich, fish, poultry, meat thinly sliced or put through a food chopper for a sandwich filling; salted peanuts, pecans or walnuts, chopped finely for the sandwich, supplies a goodly variety of tissue-building. In fact, there are few foods that cannot be combined to make a good sandwich filler.

The "something fat" does not mean something greasy, but something containing one of the good wholesome fats—butter, cream, egg yolks, bacon. Egg yolks, by the way, are rich in fat, each containing about a teaspoonful. They are rich, too, in iron. They make "red blood," as the saying goes, thus providing a wonderfully fine food for anemic children.

The fibery quality of the lunch may be provided through the fresh, dried, stewed, or baked fruits, or through the edible portion of green plants, such as lettuce, cress, celery, and radishes. Apples, oranges, peaches, and pears are all desirable because they are refreshing and because of the fibery quality of the pulp. The fibery foods are a necessity in every meal, for through them is maintained a healthful, normal condition of the bowels.

The sweet quality of the lunch may be had from the fruit or custards or from the jelly or jam sandwiches, always so welcome to the hungry child. Let us hope, however, that the jam will be of a more substantial quality than that in the sandwiches prepared for Tom and Maggie in "The Mill on the Floss." Maggie, always eager to please Tom, offered to take the slice of bread from which the jam had run off. Tom insisted that she must choose blind-fold. The desirable half, as you remember, fell to Maggie, and Tom began to

be cross because she still begged for the inferior piece. She ate the piece as she was ordered, only to have her heart broken as she finished the last crumb by Tom's taunt, "Oh, you greedy thing!"

The something savory of the lunch rarely need be looked after as an extra, for the well-seasoned food of the lunch will undoubtedly provide this quality: for example, the appetizing sandwich, the acid fruit, the jelly or spiced preserve.

The liquid for the meal will, in most cases, be provided from the school water supply. Hence, it is necessary to see to it that the water is clean, wholesome, and protected from contamination, and that individual cups are in use.

Lunches are frequently faulty through excess of some one or other kind of food. For example, on a day when the sweet is to be provided in the form of a cup custard, the eggs would rightly be omitted and the jelly or jam sandwich might be substituted. The packing of the lunch is worthy of attention. Fortunately, children are such voracious eaters that the attractiveness of the lunch is not a matter of great concern, provided the child is well; on the other hand, with the child of delicate appetite these things do play an important part. Paper napkins may be had for one dollar a thousand, and paraffine paper for wrapping may be bought at the small price of fifty sheets for ten cents. Both of these commodities are worth while from a sanitary standpoint.

An important consideration in school diet is to prevent monotony, which becomes so common from economic reasons or sometimes from carelessness. A little study and thought expended upon this subject can always result in furnishing variety in a wholesome diet without material increase of expense.

FOUR SUGGESTED MENUS FOR SCHOOL LUNCHES.

- (1) Egg sandwiches, baked apple, ginger-bread, salted peanuts.
- (2) Finger rolls, cottage cheese, jelly, nuts, sponge cake.
- (3) Chicken sandwich, spiced figs, cup custard, tea-cakes.
- (4) Peanut butter sandwiches, ripe fruit, plain cake (frosted).

BREAD DOUGHS.

BY MRS. CHARLES MCKIMMON.

In the making of bread there are four things of prime importance: a good lively yeast, a thorough kneading of the dough, right conditions and temperature under which the dough is left to rise, and, lastly, a properly heated oven. I know many people would add to this list a first-grade flour, but I do not think it properly belongs here. I have frequently seen good bread made from indifferent flour, where conditions were good, yeast up to the standard, and the kneading properly done; but I have never seen good bread made when any one of the four first-named conditions was lacking. We will therefore select the best grade of flour our pocketbook affords, realizing, if we are unable to buy the more finely bolted flours, that proper care and the use of good yeast will produce good results from even the very dark grades.

Yeast to be good must be kept under certain conditions. It is a little plant and needs for its proper development heat, moisture, air, and sugar, or starch which has been converted into sugar, to feed upon. In feeding, the little yeast plant gives off carbon dioxide gas and alcohol. This gas, pushing through the elastic dough, stretches it out into a light, fluffy mass. If this be left too long to rise, the gas breaks through at the top and sails away into the air, and the dough, having nothing to support it, falls. Therefore, we must be very careful to knead the dough for the second time and make into

rolls or loaves when the mass has doubled its bulk, and not let it wait until so much gas has formed that we have a coarse, porous bread, or until the dough has been stretched to its limit and the gas breaks through and leaves us with a fallen, sour mass, fit only for the garbage pail.

A thorough kneading is necessary, first, to distribute the little yeast plant evenly through the dough; second, to inclose air in the dough, which is necessary for the forming of the gas; and, third, to make the gluten in the flour more elastic.

Let us take a cake of Fleischmann's yeast, crumble into a cup of milk which has been scalded and then cooled to blood heat, add to this a tablespoon of sugar as food for our little yeast plant, and watch the effect. In 10 minutes the yeast will rise to the top of the cup, if it be fresh. The little plants feed upon the sugar, generate the gas bubbles, and the yeast is borne to the top. This is always a test for fresh, live yeast. We will add to this yeast and milk two tablespoonfuls of melted lard (not hot), and to make our bread lighter we will put in half a cup of mashed Irish potatoes—more food for the yeast plants, you see (starch, which is going to be converted into sugar). Mix the potatoes with $\frac{3}{4}$ cup of lukewarm water and pour with the yeast mixture into a bowl.

Sift one level quart of flour and add half of it to the yeast mixture, beating with light stroke to incorporate air in your dough. Add to this one unbeaten egg, and gradually sift in the remainder of the flour to which you have added the salt. Salt retards the growth of our yeast plant, though it is necessary for seasoning, so we add it as late as possible. When the batter has become too thick to beat, turn out on your pastry board and knead thoroughly, drawing out the dough and folding over to inclose as much air as possible. Cut your mass of dough halfway through with a knife, and turn inside out to make sure every part is well kneaded.

Grease an earthenware crock, something higher than it is broad, and put in it the dough. Place cloth and plate over the top to exclude the air. You wish to inclose air in your dough, but that is all the use you have for the air in bread-making. A draft is fatal to rising dough, and to have it blow across unprotected loaves makes a hard crust, which is most undesirable.

Set this dough to rise in a protected place, therefore, free from drafts, and have an even temperature of from 77 to 95 degrees. The corner shelf in a kitchen with the doors and windows shut would be a good place.

This dough should double its bulk in from 2½ to 3 hours, if you have an even temperature. However, should conditions be unfavorable, wait until your dough is twice as bulky as it was when you placed it in the jar. It is then ready for the second kneading.

Look as you empty the dough on your pastry board at the hundreds of little strings into which it has been stretched by the gas bubbles. The more thorough the kneading has been, the finer the strings, which will later harden by baking into the fine-grained bread-crumbs.

Knead the dough the second time very lightly, just a pat or two to get it into shape. Roll out with your rolling pin about half an inch thick, and cut into circles with a half-pound yeast powder box. We are going to make "pocketbook rolls," as they have a great deal of crust and are quickly baked. Grease one side of circle, fold in the middle, grease top of the flap and place in a shallow greased biscuit pan which has been slightly warmed. Cover with a cloth and put in warm place free from drafts. Let rise until light, usually from 1 to 1½ hours. If conditions are not favorable, let stand until bulk is doubled.

The oven should be hot. Sift flour on oven floor, and if it browns quickly but does not burn, the oven is right. These rolls bake in about 10 minutes and are both delicious and wholesome hot.

Never wrap warm bread in a cloth or put it in a covered box. Wait until thoroughly cold before putting away. It will have a musty, disagreeable odor otherwise.

POCKETBOOK ROLLS.

One cake Fleischmann's yeast, $\frac{1}{2}$ cup liquid yeast, $\frac{1}{2}$ glass milk scalded and cooled, $\frac{1}{2}$ glass tepid water, 1 tablespoonful sugar, 2 tablespoonfuls melted lard (not hot), 1 egg (unbeaten), 1 rounded tablespoonful Irish potato boiled and mashed, 1 level quart of flour, 2 level teaspoonfuls salt.

Fill glass with water and milk, add sugar, crumble into this cake of yeast. When yeast has risen to top of liquid, add lard.

Sift in enough flour to make batter, to which may be added the egg and Irish potato. Gradually add rest of flour until you have a medium stiff dough, putting in the salt in the last part of your flour.

Knead until smooth and elastic. Place in greased bowl, cover and put away to rise in warm place (80 to 85 degrees). When it has doubled its size, pour out on board, knead lightly, and shape into pocketbook rolls. Set away to rise and when light bake in hot oven for 10 minutes.

QUICK ROLLS OR TEA ROLLS.

One cake Fleischmann's yeast, $\frac{1}{2}$ cup milk, scalded and cooled, $\frac{1}{2}$ cup lukewarm water, 1 tablespoonful sugar, 3 cups sifted flour, 2 tablespoonfuls lard or butter, melted, $\frac{1}{2}$ teaspoonful salt.

Dissolve the yeast and sugar in the lukewarm liquid. Add lard or butter and half of the flour. Beat until smooth. Add rest of flour, or enough to make a moderately firm dough, and lastly the salt. Knead thoroughly. Roll out and shape as pocketbook rolls. Place in well-greased, shallow baking pans, cover and set to rise in a warm place, free from draft, for about 2 hours. When light bake in a hot oven 10 minutes.

One small Irish potato boiled and mashed and one unbeaten egg may be added to these rolls if desired.

WHITE BREAD (QUICK METHOD).

Two cakes Fleischmann's yeast, 1 quart lukewarm water, 2 tablespoonfuls sugar, 2 tablespoonfuls lard or butter, 3 quarts sifted flour, 1 tablespoonful salt.

Dissolve yeast and sugar in lukewarm water, add lard or butter, and half the flour. Beat until smooth, then add salt and balance of the flour, or enough to make dough that can be handled. Knead until smooth and elastic. Place in greased bowl, cover and set aside in a moderately warm place, free from draft, until light—from 2 to 3 hours. Mould into loaves. Place in well-greased bread pans, filling them half full. Cover and let rise from 1 to 2 hours or until double in bulk. Bake 45 to 60 minutes.

WHITE BREAD (FOR USE OVERNIGHT).

One cake Fleischmann's yeast, 2 quarts water, 6 quarts sifted flour, 2 tablespoonfuls lard or butter, melted, 2 tablespoonfuls sugar, 2 tablespoonfuls salt.

One Irish potato baked and mashed may be added to the water to the betterment of the bread.

Dissolve yeast and sugar in the water, which should be lukewarm in winter and cool in summer; add two tablespoonfuls lard or butter and half the flour. Beat until smooth, then add balance of the flour, or enough to make moderately firm dough, and lastly, the salt. Knead until smooth and elastic. Place in well-greased bowl and cover. Set aside to rise overnight, or about 9 hours. In the morning mould into loaves. Fill well-greased pans half full, cover and let rise until light, or until loaves have doubled in bulk, which will be in about $1\frac{1}{2}$ hours. Bake 40 to 50 minutes.

This will make six large loaves. If this quantity of bread is not needed, the recipe can be divided very easily, by taking just half of the ingredients called for above, as well as half the cake of yeast. The half cake of yeast which you have left over can be kept in good condition several days by rewrapping it in the tinfoil and keeping it in a cool, dry place.

One cup of liquid yeast, or 1 cake dry yeast, may be used instead of Fleischmann's yeast.

PREPARATION OF FOOD FOR THE SICK.

BY MISS JANE E. WARD.

Statistics prove that two-thirds of all disease is brought about by error in diet. The correct proportions of food principles have not been maintained, or the food has been improperly cooked. Physicians agree, with but few exceptions, that the proper preparation of food for the sick is of as great importance in the restoration to health as administration of drugs.

Time and manner of serving are of equal importance. Take especial care in setting an invalid's tray. Cover with a spotless tray cloth or dinner napkin, folding it until it is no larger than the tray. Select the daintiest china and glass, making changes as often as possible. Lay a bright flower on the tray to cheer the patient, and have the dishes arranged in the most convenient manner. Avoid having too many things on the tray at one time. If more than one course is to be served, remove one before another appears. Foods which are intended to be served hot should be placed in heated dishes and kept covered, so the patient may receive them hot. Equal care should be taken to have cold foods served cold; never lukewarm. Never consult a patient as to his menu. If there is anything he especially desires, you will be informed. Serve food in small quantities; the sight of too much often destroys the appetite. If liquid diet must be adhered to, give as great variety as is allowable. After the completion of a meal, the tray should be removed from the sickroom, the remaining solid food burned and liquids disposed of at once. All the food prepared for the sick should be of the best quality and cooked in the simplest and most careful manner. Tea, coffee, or chocolate should be taken to the sickroom in a small pot and poured in the presence of the patient. No one, unless he has been ill, can understand the terrible sinking feeling that comes to a weak patient, if the time for his taking food is forgotten. Therefore it should be always ready at exactly the same regular time.

In caring for the sick, an infinite amount of patience, sympathy, and cheerfulness is required. If one be harsh or neglectful, even once, it may mean a whole life of regret.

Liquid foods may first be considered. Barley water and rice water are generally used to reduce a laxative condition. Toast water is often beneficial in cases of extreme nausea. A small quantity of clam water may be given when the stomach refuses to retain other foods. Oatmeal water is occasionally ordered for dyspeptic patients. In the hottest days of summer it may be drunk with safety where ice water would be extremely dangerous. Fruit waters are principally used for fever patients. They are cooling, refreshing, and mildly stimulating, and are valuable for the salts and acids they contain. Beef essence, which is the expressed juices of beef, being nutritious, is given when a condensed form of food is necessary. Beef tea contains the juices of beef diluted with water, and is given as a stimulant, rather than as a nutrient.

Eggnogs are recommended where it is necessary to take a large amount of nutriment daily, as is often the case when the system is much reduced by a severe illness.

Semisolid foods comprise the gruels. When made from corn or oatmeal they are heat-producing, and should never be given when inflammatory symptoms are present. Flour and cracker gruels often assist in reducing a laxative condition. Arrowroot makes a delicate gruel, is more easily digested than any other form of starch, and is often valuable in cases of gastric irritation. It should never be given to infants.

Solid foods comprise the principal diet during convalescence. They should be nutritious, easy of assimilation, and given frequently in small quantities, and at regular intervals. The convalescent, if allowed to follow his own inclinations, often produces a relapse by improper diet.

The most important consideration of drinks is that of adding something to increase the nutritive value while allaying thirst.

When cereals are employed they require thorough cooking and careful straining. When albumen is used, fresh eggs are required, the shells of which must be washed before they are opened. They should also be used as soon as possible after they are removed from their shells, as they are subject to speedy decomposition when exposed to the air.

As the white of egg is the purest form of uncooked albumen, it is a valuable way of giving a patient nourishment with different drinks. When a concentrated form of albumen is required use the dried albumen, prepared as follows: Scald a large china plate and have it hot enough to dry quickly. When cooled, just cover the dish with the whites of fresh eggs. Stand this in a warm place (125° F.) until the water in the white of egg has evaporated and the albumen is dry. It should then look like pieces of gelatin. Break it apart and place in sterilized jars, cover tightly, and it is ready for immediate or future use. It can be dissolved in any liquid, as beef tea, milk, etc., and if not served cold must not be heated beyond a temperature of 120° F., or it will begin to coagulate.

ALBUMENIZED WATER.

Put a cup of cold water and the white of one or two eggs into a jar with a lid. Shake until thoroughly blended; strain carefully through a fine strainer or cheese-cloth. Barley water, rice water, whey, cold lemonade, and milk (which has been pasteurized and cooled to blood heat) may be albumenized in the same manner.

BARLEY WATER.

Three tablespoonfuls barley, salt, 4 cups cold water, lemon juice. Pick over barley and soak in water overnight. Boil gently 1½ hours. Strain; season with salt, lemon juice, and sugar. Reheat and serve.

RICE WATER.

Two tablespoonfuls rice, milk or cream, 2 cups cold water, salt. Boil rice until tender; strain and add to rice water milk or cream, as desired. Season with salt and reheat. A half-inch piece of stick cinnamon may be cooked with rice and will assist in reducing a laxative condition.

TOAST WATER.

One slice of bread, 1 cup of boiling water. Toast the bread; pour over the boiling water; cover and let stand 30 minutes; strain and cool.

APPLE WATER.

Bake one good-sized apple until tender, put in a bowl and cover with 1 pint of boiling water. Cover and let stand until the apple is cold; strain. If desired, sugar may be added.

OATMEAL WATER.

Add 1 tablespoonful of rolled oats or oatmeal and ¼ teaspoonful of salt to 1 quart of boiling water and cook in a double boiler at least 2 hours. Strain and serve hot or cold.

EGGNOG.

One egg, ⅔ cup milk, 1 tablespoonful sugar, 2 tablespoonfuls wine, or, 1 tablespoonful brandy, few grains salt. Beat egg slightly, add salt, sugar, and wine; mix thoroughly, add milk and strain. Wine may be omitted and a slight grating of nutmeg used.

FLOUR GRUEL.

One tablespoonful flour, 2 cups milk, salt. Mix flour with ¼ cup of milk. Scald remaining milk in double boiler; add flour paste and cook 30 minutes. Season.

INDIAN GRUEL.

Two tablespoonfuls Indian meal, cold water, 1 tablespoonful flour, 3 cups boiling water, $\frac{1}{2}$ teaspoonful salt, milk or cream. Mix meal, flour, and salt; add cold water to make a thin paste. Add to boiling water, and boil gently one hour. Dilute with milk or cream. A richer gruel may be made by using milk instead of water, and cooking 3 hours in double boiler.

OATMEAL GRUEL.

Half cup coarse oatmeal, 1 teaspoonful salt, 3 cups boiling water, milk. Add oatmeal and salt to boiling water and cook 3 hours in double boiler. Force through a strainer, dilute with milk or cream, reheat and strain a second time.

WATER.

To remove the danger of disease germs in contaminated districts, bring to a boil and continue to boil at least 20 minutes. Pour immediately into sterilized bottles; plug with sterilized cotton.

When making tea and coffee, it is most important that cold water is brought to a boil, as it soon becomes flat and insipid upon continued boiling.

TEA.

Half level teaspoonful tea, 1 cup or $\frac{1}{2}$ pint of water. Scald the pot and drain. Bring the cold water to a boil and pour immediately over the tea. Cover the pot for 5 minutes, and serve in a heated cup. If not served immediately, remove the tea-leaves and keep warm below the boiling point. It must be remembered that "tannin," the objectionable ingredient of tea, is rendered soluble by boiling or long steeping.

COCOA.

Moisten 1 tablespoonful of cocoa and 1 teaspoonful of sugar with a little cold water; add 1 cup of boiling water, and stir until it boils. Serve with scalded milk or whipped cream.

TOASTS.

It is an art to make good toast. The object is to convert the starch into dextrin, giving the starch its first step in digestion and that agreeable flavor that is noticeable in the crusts of bread. This can only be accomplished by subjecting the bread to a high temperature after it has been thoroughly dried. Toast must be crisp to the very center and a golden brown. When properly made, it can be easily broken and is quickly moistened by the saliva. It also makes mastication absolutely necessary, which is a great advantage, especially to invalids and children. When a soft toast is desirable, moisten the crisp toast by dipping it quickly into hot water, milk or starch.

Toast should be served immediately from the fire; when this is not possible, cover tightly and keep in a warm place or it will become very hard.

EGGS.

Eggs are highly nutritious, but to be easy of digestion must be cooked at a low temperature (130 to 160° F.), or the white will be rendered tough instead of soft and creamy. Therefore the so-called "soft-boiled egg" must not be boiled at all. Whenever the white of an egg is whipped to a froth it is more easy of digestion, since the digestive fluids act more readily upon it. Hence the value in the steamed or frothed egg.

To be palatable, unless served raw, eggs must be eaten while hot. Previous to cooking, the bowl or dish in which they will be served should be heated. Have everything in readiness that they may be served immediately.

Steamed or Frothed Eggs.—One egg, a few grains salt, a small piece of butter. Have a little water boiling in a large covered saucepan. Separate the egg, beat the white to a stiff froth and heap it into a dainty bowl. Make a

little well in the center, drop in the yolk (whole), place the bowl in the saucepan, cover the pan closely. Remove all from the fire and let stand five minutes. Remove the egg from the water and serve immediately with salt and butter.

Soft-cooked Eggs.—Place one or two eggs in a small saucepan, pour over them a pint of *boiling* water. Cover closely and let them stand off the fire for from 8 to 10 minutes (according to the size of the eggs). Remove eggs from the water and serve in a heated cup with a few grains of salt and a little butter.

MILK.

Milk is a food, not a beverage, and therefore should be taken slowly. In many cases it is also advisable that it be taken slightly warmed, as the stomach will not then be subjected to shock. Vary the monotony in prolonged feedings of milk (when allowed by the physician) by changing the flavor and taste, serving a plain junket or rennet, milk jelly, etc. Milk is easily contaminated, and may be the means of transmitting many diseases, unless the utmost cleanliness is observed in its handling from the time it is taken from the cow until it is used by the individual. It is also extremely necessary that it be kept in scrupulously clean vessels, and should always be kept air-tight, especially that which has been pasteurized or sterilized, as it is then just as easily decomposed as before.

HOME SEWING.

By MISS MINNIE W. HOPPER.

At present a girl's education is scarcely considered complete unless it includes some knowledge of sewing. And to my mind this part of a girl's education should be acquired largely at home. If she wishes to become a professional artist along this line, she should add to this home training a good course in sewing in some technical school. But alas! how often this home training is neglected.

It seems to me the only way to account for a mother's neglect of this training is to attribute it to the fact that most mothers do not appreciate the educative value of the study of sewing and the effect it has upon the development of character. Most of us are agreed that there are many subjects taught in our schools that are of no practical value and that have little relation to the after-life of the pupil. Since we are not to blame for this state of affairs, and since it has long been the custom of our fathers to pursue these studies, we condone the fact and allow a child to waste many precious hours studying something that is of no practical value, by saying it is cultural. True, they give culture, but are these the only culture studies? One dictionary gives as a definition of the word culture, "refined by mental training." This is the generally accepted meaning of the word. It does not say trained by study of dead languages, higher mathematics, or remote sciences. It says "mental training," without designating the method or means of that training. It is easily proven that a liberal course in sewing, properly taught, and judiciously correlated with other subjects, gives more mental training, and thereby more culture, than a course in Latin. A course in sewing must train at least three mental faculties, and if properly correlated it may train them all. We cannot be skilled in the use of the needle without considerable cultivation of our perception, imagination and memory. The average course in Latin is acquired by the cultivation of memory almost exclusively. This leads us to believe that the study of sewing, well taught, has a higher culture value than Latin. Then if we may acquire culture by pursuing a practical subject, let us do so by all means. Outside of the practical value to be found in the use of the needle, the mental training through the hand and eye has

a moral effect upon the character. This training of the hand makes it dexterous in other employments. Habits of thrift, cleanliness, patience, and accuracy are inculcated, economy taught, and the inventive faculty developed.

There certainly is a strong sociological, economic, and ethical argument for the teaching of sewing. It is not alone to prepare for a trade; it is to give mental and moral strength, to increase appreciation of the true and beautiful, and to develop a love for doing and a desire to do for others. As soon as reasonable skill has been acquired in sewing, a systematic study of correct lines, symmetrical curves, and harmony of color should be given. A well designed, well cut, and well finished garment requires as high a type of art as the painting of a picture or the rendering of a difficult musical composition.

Since the home neglected this important training, the public saw the neglect and incorporated a course of sewing in the public schools, and, under the circumstances, this is right and well. But the majority of girls would gain much if this course were given in the home. When girls are in the grades that usually carry the sewing course, they are just at the age when the least mental strain, the fewest number of hours in the schoolroom, and the least amount of excitement is best for them. How much better that she learn these lessons in the quiet, healthful atmosphere of the home than in the often overcrowded, overheated, and underventilated schoolroom. In home instruction she saves the time taken up in a class lesson. Any one knows that in teaching one pupil time is saved, because the teacher can fix individual attention upon the one pupil and can be ready to give the necessary help and instruction whenever needed. Then, when learning sewing at home the girl is generally given articles to make that are to be put to immediate use; thus she can see more plainly the advantages and disadvantages of the way the article is made, and can improve on the next copy. She is more likely to take an interest in the work if she sees that it counts for something, and some member of the family is to use her handiwork.

To teach sewing a mother must go about it in a methodical manner or failure instead of success will be the result. A certain hour each day should be set aside for the sewing lesson, and as in the days of Priscilla, when all the maidens worked and kept their samplers, fraught with happy memories of girlhood dreams, so let our modern Priscilla keep her sample sewing book not only as a living memento of joyous girlhood, but as a reference book. At any time when she has need for a stitch that has not been used for some time, instead of racking her brain to recall it, or taking time to run to a neighbor for the information, she can turn to it in her book and find it done in her own handiwork and with any directions necessary written on the opposite page.

You will never regret having your little girl make a sewing book, nor is their construction difficult, and they may be made a work of art if care and pains are taken with them. Any composition book that carries ink well may be utilized, and a tube of printer's paste is necessary for pasting in the samples. There are several ways of arranging them. Probably the best plan is by a classification of stitches. Begin with the plain stitches, including the running stitch, back stitch, half-back, overhand, overcast, gathering, hemming and buttonholing. Have the child practice on any material till she can make these stitches nicely. Then let her make a sample on a small piece of muslin, or cambric, paste it on a page in her book, and write the name under it. On the opposite page write directions for making it, its use, and list of articles made by it. In making the buttonhole on the sample piece for the book, allow room enough to sew on button. The sewing on of tape, hooks, and eyes could well come in at this point. Patching and darning might be given next. A neatly done patch of all the various kinds should adorn separate pages, with name and directions for making each. Last, take up ornamental stitches, such as heron bone, feather stitch, fagot, hemstitch and cross stitch, and end with all kinds of embroidery stitches, making a sample of each.

This book might be, although not necessarily, completed before garment making is begun. In garment making the beginner should be taught accuracy,

neatness in finishing seams, turning corners, etc. In fact, the inside of a garment should be as neat in appearance as the outside.

To allow students to leave raw seams and rough edges on the inside of a garment tends to cultivate loose morals and untidy habits in other work. The only woman in the world that has a right to leave unfinished seams is the woman with a house full of children, and who does, besides her sewing, her own cooking, washing, milking, churning, and house cleaning. In teaching sewing we should try to eliminate from the girls' minds all liking for tawdry trimming, gaudy decoration, and follies of fashion. She should be taught that the beauty of a garment depends upon its artistic arrangement, its appropriateness, simplicity, and durability, rather than its quality of attracting attention.

The present styles are to be recommended for their simplicity and economy, both of stitching and use of material. Think how much time and sewing is saved by not having to make and set in sleeves. Then the narrow skirts require less material, less sewing, and less time in getting them even at the bottom. To the art student their symmetrical lines and graceful curves recommend themselves as being the best that has been admired in wearing apparel for centuries past. Many people severely criticise the tendency to low neck and short sleeves for street wear. From a hygienic standpoint this style is vastly preferable to the collar that irritates the chin and the sleeve that lies over the hand. The present style allows free circulation of the blood to the face and neck, and also allows a freer circulation of the air around the body as well as exposing to air and sunlight a greater area of the skin.

FARMERS' AND WOMEN'S NORMAL INSTITUTE, FOR INSTITUTE LECTURERS.

JULY 20, 21, 22, 1911, HIGH SCHOOL BUILDING, RALEIGH, N. C.

PROGRAM.

First session convenes Thursday Morning, July 20, at 9:30.

Call to order by Hon. J. Bryan Grimes, presiding.

Prayer by Dr. T. W. O'Kelly.

Address of Welcome by Hon. James I. Johnson, Mayor of Raleigh.

Response by T. B. Parker.

Address: The Farmers' Institute Lecturer, by S. B. Heiges.

Address: The Woman's Institute Lecturer, by Mrs. Henrietta W. Calvin.

Address: The Institute Lecturer's Opportunity, by Dr. W. S. Rankin.

WOMEN'S MEETING.

Paper: Health Hints, by Miss Katharine Parker.

Paper: Health on the Farm, by Mrs. Emelie McGilvary Orr.

Paper: Sanitation, by Mrs. Alda M. Bird.

AFTERNOON SESSION.

Call to order at 3 o'clock.

Demonstration: Canning Fruits and Vegetables, by S. B. Shaw.

Demonstration: Bread-making, by Mrs. Charles McKimmon.

Paper: Best Methods of Cooking, by Miss Minnie W. Hopper.

Paper: System in the Work of the House, by Miss Minnie L. Jamison.

EVENING SESSION.

Call to order at 8:30.

Paper: Suggestions in Household Work, by Mrs. C. R. Hudson.

Paper: Possible Improvements in Home Life, by Miss Edna Reinhardt.

FRIDAY MORNING, JULY 21.

Call to order at 9 o'clock.

- Paper: Sanitation v. Household Pests, by Miss Minnie W. Hopper.
 Paper: Sanitation, by Mrs. Alda M. Bird.
 Paper: Preventable Diseases, by Mrs. W. N. Hutt.
 Paper: Preventable Diseases, by Miss Edna Reinhardt.

AFTERNOON SESSION.

Call to order at 3 o'clock.

- Demonstration: Canning Fruits and Vegetables, by S. B. Shaw.
 Demonstration: Breads and Bread-making, by Miss Minnie L. Jamison.
 Paper: Cooking of Meats, Mrs. Charles McKimmon.
 Paper: Home Canning, by Mrs. C. R. Hudson.

EVENING SESSION.

Call to order at 8:30 o'clock.

- Paper: Food and Dietetics, by Mrs. Emelie McGilvary Orr.
 Paper: The Care of the Baby, by Miss Minnie W. Hopper.

SATURDAY MORNING, JULY 22.

Call to order at 9 o'clock.

- Paper: Prevention of Diseases, by Mrs. F. L. Stevens.
 Paper: The Care of the Infant, by Mrs. Sue V. Hollowell.
 Paper: The Country Home, by Miss Lucie T. Webb.
 Paper: The Needs of the Country Woman, by Miss Lala Mundy.

AFTERNOON SESSION.

Call to order at 3 o'clock.

- Demonstration: Canning Fruits and Vegetables, by S. B. Shaw.
 Demonstration: Bread-making and Quick Rolls, by Miss Katharine Parker.
 Paper: Foods, Their Cooking and Uses, by Mrs. W. N. Hutt.
 Paper: Conveniences of the Farm Home, by Mrs. F. L. Stevens.

MEN'S MEETING.

THURSDAY MORNING, JULY 20.

- Soil Improvement: (1) By Conservation of the Soil and Moisture, by Prof. C. L. Newman.
 (2) By Improving the Texture of the Soil, by E. S. Millsaps.
 (3) By Increasing its Moisture Capacity, by T. J. W. Broome.

AFTERNOON SESSION.

- Soil Improvement: (4) By Open or General Tillage, by C. R. Hudson.
 (5) By Farm Resources, Stable and Green Manuring, etc., by J. M. Gray.
 (6) By Growing Legumes, by G. M. Garren.

EVENING SESSION.

Call to order at 8:30.

- Commercial Fertilizers: (1) Their Relation to Soil Improvement, by E. L. Worthen.
 (2) For Special Crops, by T. E. Browne.
 (3) Home Mixing, by T. Frank Parker.

FRIDAY MORNING, JULY 21.

Call to order at 9 o'clock.

Special Crops:

- Cotton: (1) Varieties and Fertilization of, by Prof. C. L. Newman.
 (2) Preparation of Land and Cultivation, by T. J. W. Broome.
 Corn: (1) Preparation of the Soil, by G. M. Garren.
 (2) Cultivation, by E. S. Millsaps.
 (3) Seed Selection, by C. R. Hudson.

AFTERNOON SESSION.

Call to order at 3 o'clock.

- Fruits: (1) Growing, by W. N. Hutt.
 (2) Commercial Handling, by S. B. Shaw.
 Vegetables: The Vegetable Garden, by O. M. Clark.

EVENING SESSION.

Call to order at 8:30.

- Peanut Culture, by T. E. Browne.
 Tobacco Culture, by E. G. Moss.

SATURDAY MORNING, JULY 22.

Call to order at 9 o'clock.

- Live Stock: (1) Diseases of, and Draft Horses, by Dr. W. G. Chrisman.
 (2) Care and Management, and Light Horses, by Dr. G. A. Roberts.
 (3) Beef Cattle, by A. L. French.
 (4) Dairying and Dairy Cattle, by J. M. Gray.

AFTERNOON SESSION.

- Poultry: (1) Housing and Management, by J. P. Kerr.
 (2) Breeds and Feeds, by J. S. Jeffrey.
 The Farmers' Institute, How to Improve. General discussion.
 Different Forms of Lime and How to Use It, by C. B. Williams and E. L. Worthen.
 Spraying and Plant Diseases, by Dr. F. L. Stevens.

STATE FARMERS' CONVENTION.

(ROUND-UP INSTITUTE.)

At the instance of the faculty of the North Carolina College of Agriculture and Mechanic Arts, in coöperation with other interested parties, the State Farmers' Convention was organized seven years ago. Subsequently, at the 1906 meeting, the Farmers' Convention was affiliated with and made a part of the Farmers' Institute work conducted by the State Department of Agriculture.

From the first meeting of the convention it has grown in numbers and usefulness. The attendance this year was the largest in the history of the convention.

The following very interesting program was carried out:

TUESDAY, AUGUST 29, 1911.

- 10:30 A. M.—Addresses of Welcome. Governor W. W. Kitchin, Commissioner W. A. Graham, President D. H. Hill.
 11:00 A. M.—Address. Clarence H. Poe, editor *Progressive Farmer*.
 11:45 A. M.—The Farmer's Balance Sheet with His Soil. B. W. Kilgore, State Chemist.
 Discussion.
 12:30 P. M.—Dinner.
 2:00 P. M.—Tobacco Curing. E. G. Moss, U. S. Department of Agriculture.
 Discussion.
 2:45 P. M.—Farm Seeds, Pure and Adulterated. Miss O. I. Tillman, State Department of Agriculture.
 Discussion.
 3:30 P. M.—Tile Drainage. A. G. Smith, U. S. Department of Agriculture.
 Discussion.
 4:15 P. M.—Demonstration of Various Kinds of Plows.
 7:30 P. M.—Annual Address by President of the Convention. Frank Shields, Scotland Neck, N. C.
 8:15 P. M.—Cotton Standardization. D. E. Earle, U. S. Department of Agriculture.

WEDNESDAY, AUGUST 30, 1911.

- 8:10 A. M.—Stock Judging—Horses. Prof. J. C. McNutt.
 10:15 A. M.—My Experience with Hogs. W. H. Merrimon, of Illinois.
 Discussion.
 11:00 A. M.—The Guernsey Cow and Her Island Home. W. H. Caldwell, Secretary American Guernsey Club.
 Discussion.
 12:00 A. M.—The Feeding of Farm Animals. J. C. McNutt, of Agricultural and Mechanical College.
 Discussion.
 12:30 P. M.—Dinner.
 1:00 P. M.—Auction Sale of Fifty Pure-bred Berkshire Hogs. By N. C. Berkshire Breeders' Association.
 7:30 P. M.—How I Raised 146 Bushels of Corn. Ernest Starnes, Hickory, N. C.
 7:45 P. M.—Song—"The Corn Club Boys." Mrs. Charles McKimmon.
 8:00 P. M.—Boys' and Girls' Clubs in the South (Illustrated). O. B. Martin, Washington, D. C.
 9:00 P. M.—Business Meeting State Live-stock Association.
 9:30 P. M.—Business Meeting of the North Carolina Berkshire Breeders' Association.

THURSDAY, AUGUST 21, 1911.

- 8:10 A. M.—Stock Judging—Cattle. Prof. J. C. McNutt.
 10:15 A. M.—Handling of Sandy Land. A. M. Swinnerton, Manager Pinehurst Farm.
 Discussion.
 10:45 A. M.—Results of the Demonstration Work. C. R. Hudson, State Agent.
 Discussion.
 Parcel Post. E. E. Miller, of *Progressive Farmer*.
 11:30 A. M.—Coöperative Marketing in Catawba County. W. J. Shuford.
 Discussion.
 12:15 P. M.—Business Meeting of the Convention.
 12:30 P. M.—Dinner.
 2:00 P. M.—Address. Franklin Sherman, State Entomologist.

The College will furnish rooms free. The only expense of those attending will be 25 cents a meal. Those intending to stay at the College will please bring sheets and a pillow if they desire a pillow.

PROGRAM WOMEN'S FARM-LIFE CONVENTION, A. AND M. COLLEGE,
 WEST RALEIGH, N. C.

TUESDAY, AUGUST 29, 1911.

- Welcome to Raleigh. Mrs. T. P. Harrison, President Woman's Club.
 Welcome on Behalf Department of Agriculture. Mrs. W. N. Hutt, Chairman.
 Response. Miss Eula Dixon, Alamance County.
 Woman's Institutes. Mr. T. B. Parker, Director of Farmers' Institutes for North Carolina.
 What the College Can Do for the Home and Farm. Dr. D. H. Hill, President A. and M. College.
 The Paper and Magazine as Inspirations in the Home. Mr. Clarence H. Poe.
 Beautifying the Farm Home. Mr. Jacques Busbee.
 The Girls' Tomato Club. Mr. I. O. Schaub.

WEDNESDAY, AUGUST 30, 1911.

- Demonstration—The Killing, Dressing, and Marketing of Chickens. Mr. J. S. Jeffrey, Poultryman.
 Bee Raising. Mr. Walter Womble.
 Pickles. Mrs. W. N. Hutt.
 Demonstration—Quick Breads. Miss Katherine Parker.
 Demonstration—Light Breads. Mrs. Charles McKimmon.
 The State Fair as a Source of Pin Money. Mr. Joseph E. Pogue, Secretary State Fair Association.
 Demonstration—Home Dressmaking. Mrs. Frank Register, Halifax County.
 The Pure Food Crusade. W. M. Allen, State Food Chemist.

THURSDAY, AUGUST 31, 1911.

- Sanitation in the Farmhouse. Miss Minnie Hopper.
 Home Helps. Miss Jane Ward.
 Sanitation on the Farm. Mrs. C. R. Hudson.
 Mothers' Clubs. Mrs. F. L. Stevens.
 Sanitation in Schools. Mrs. W. R. Hollowell, President State Betterment Association for North Carolina.
 Moral Training of Children. Mrs. Emelie McGilvary Orr, Statesville.
 The College Girl's Opportunities. Miss Minnie Jamison, State Normal.
 How to Obtain Pure Water. Miss Daisy Allen, Water Analyst, State Laboratory of Hygiene.
 The Care of Babies. Dr. Dixon-Carroll.
 The School Teacher. Miss Webb, Warren Plains.
 Housekeeping in Foreign Lands. Col. Fred Olds, Secretary Raleigh Chamber of Commerce.

OFFICERS OF THE 1912 STATE FARMERS' CONVENTION.

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Vice President.....	R. P. HAYS.....	Asheville.
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COUNTY VICE PRESIDENTS.

Alamance.....	Edgar Long.....	Graham.
Alexander.....	R. N. Looper.....	Hiddenite.
Alleghany.....	S. F. Thompson.....	Walls.
Anson.....	Dr. W. J. McLendon.....	Wadesboro.
Ashe.....	Capt. John Dent.....	Jefferson.
Avery.....	W. H. Olles.....	Newland.
Beaufort.....	B. H. Thompson.....	Aurora.
Bertie.....	C. W. Spruill.....	Quitsna.
Bladen.....	O. L. Clark.....	Clarkton.
Brunswick.....	Jack Johnson.....	Winnabow.
Buncombe.....	Dr. A. S. Wheeler.....	Biltmore.
Burke.....	J. E. Coulter.....	Connelly Springs.
Cabarrus.....	John P. Allison.....	Concord.
Camden.....	John E. Foster.....	South Mills.
Caldwell.....	J. C. Coffee.....	Ridsen.
Carteret.....	C. V. Robinson.....	Morehead City.
Caswell.....	B. S. Graves.....	Yanceyville.
Catawba.....	John W. Robinson.....	Newton, R. F. D.
Chatham.....	B. N. Welch.....	Bear Creek.
Cherokee.....	W. P. Walker.....	Andrews.
Chowan.....	J. K. Mason.....	Edenton, R. F. D.
Clay.....	W. T. Bumgarner.....	Hayesville.
Cleveland.....	A. A. Warlick.....	Casar.
Columbus.....	J. A. Brown.....	Chadbourn.
Craven.....	Daniel Lane.....	New Bern, R. 2.
Cumberland.....	J. H. Currie.....	Fayetteville.
Currituck.....	R. O. Badger.....	Moyock.
Dare.....	C. H. Scarborough.....	Landsboro.
Davidson.....	John Grimes.....	Lexington.
Davie.....	M. J. Hendricks.....	Cana, R. F. D.
Duplin.....	J. A. Shine.....	Faison.
Durham.....	E. J. Parish.....	Durham.
Edgecombe.....	B. F. Shelton.....	Speed.
Forsyth.....	A. F. Yarbrough.....	Winston-Salem, R. 4.
Franklin.....	H. D. Edgerton.....	Louisburg, R. F. D.

COUNTY VICE PRESIDENTS.

Gaston	A. C. Stroup	Gastonia.
Gates	Martin Kellog	Sunbury.
Graham	A. C. Edwards	Japan.
Granville	E. G. Moss	Creedmoor.
Greene	W. A. Darden	Ayden.
Guilford	Z. Groom	Greensboro.
Halifax	Frank Shields	Scotland Neck.
Harnett	C. McArten	Lillington.
Haywood	R. B. Howell	Waynesville, R. 2.
Henderson	A. Cannon	Horse Shoe.
Hertford	T. E. Browne	Ahoskie.
Hyde	George E. Watson	Wysocking.
Hoke	McLean Campbell	Raeford.
Iredell	F. T. Meacham	Statesville.
Jackson	F. H. Brown	Cullowhee.
Johnston	J. Walter Myatt	Clayton.
Jones	J. C. Parker	Kinston.
Lee	J. H. Henley	Sanford, R. 1.
Lenoir	George F. Parrott	Kinston, R. 1.
Lincoln	R. M. Roseman	Lincolnton.
Macon	A. L. Siler	Franklin, R. 1.
McDowell	J. C. Pool	Marion.
Madison	J. F. Bryant	Marshall.
Martin	George L. Robertson	Robersonville.
Mecklenburg	C. E. Clark	Charlotte.
Mitchell	S. M. C. Green	Toecane.
Montgomery	O. B. Deaton	Troy.
Moore	T. D. McLean	Carthage.
Nash	S. H. Brantley	Spring Hope, R. 1.
New Hanover	W. A. Blake	Wilmington.
Northampton	John B. Griffin	Woodland.
Onslow	Dr. J. L. Nicholson	Richlands.
Orange	T. J. Oldham	Mebane, R. 2.
Pamlico	O. J. Rock	Teidsboro.
Pasquotank	F. F. Cahoon	Elizabeth City.
Pender	W. M. Hand	Burgaw.
Perquimans	W. T. McMullan	Hertford.
Person	J. A. Long	Roxboro.
Pitt	G. T. Tyson	Greenville, R. F. D.
Polk	T. T. Ballinger	Tryon.
Randolph	George R. Ross	Asheboro.

COUNTY VICE PRESIDENTS.

Richmond.....	Henry C. Dockery.....	Rockingham.
Robeson.....	W. S. Cobb.....	Lumber Bridge.
Rockingham.....	J. M. Jones.....	Reidsville, R. F. D.
Rowan.....	J. S. Hall.....	Barber.
Rutherford.....	J. N. Jones.....	Rutherfordton.
Sampson.....	Augustus Howard.....	Salemburg.
Scotland.....	J. P. MacRae.....	Laurinburg.
Stanly.....	S. A. Underwood.....	Big Lick, R. 2.
Stokes.....	I. G. Ross.....	Walnut Cove.
Surry.....	R. N. Chatham.....	Elkin.
Swain.....	Kope Elias.....	Governor's Island.
Transylvania.....	W. H. Grogan.....	Brevard.
Tyrrell.....	W. W. Sawyer.....	Columbia.
Union.....	T. B. Blakeney.....	Monroe.
Vance.....	Capt. J. M. Hunt.....	Townsville.
Wake.....	S. Wilder.....	Cary.
Warren.....	F. B. Newell.....	Warrenton.
Washington.....	T. W. Blount.....	Roper.
Watauga.....	George Bingham.....	Sugar Grove.
Wayne.....	J. M. Wood.....	Goldsboro, R. F. D.
Wilkes.....	C. C. Wright.....	Hunting Creek.
Wilson.....	K. W. Barnes.....	Lucama.
Yadkin.....	J. W. Shore.....	Boonville.
Yancey.....	W. B. Banks.....	Burnsville.

RESOLUTIONS ADOPTED BY THE STATE FARMERS' CONVENTION.

1. That the appreciative thanks of the convention are extended to the A. and M. College for the facilities it has furnished for our meeting, for entertainment, and otherwise.

2. That the efforts and services of the officers of the convention, Messrs. Frank P. Shields and I. O. Schaub, have been most valuable, and we thank them for what they have done to make the convention a success.

3. That the work of the A. and M. College in the education of the young men of the State along agricultural lines, and that of the State Department of Agriculture in what it is doing to promote and advance the agricultural interests of the State, have the hearty indorsement of the convention.

4. We believe that our farmers should have their cotton ginned on a money basis instead of for toll, and we urge them to do this, and to also insist on full tare in the selling of cotton. We strongly urge our cotton farmers to have ginned and sell their crop to meet the demands of the market and as gradually as their financial condition will permit, with a view of obtaining fair prices for both cotton and cotton seed.

5. That every encouragement possible be given to better roads, better common schools, with better teachers, better paid, and longer terms for school. We believe that agriculture should be taught in the public schools, and we urge that every means possible be used to bring this about.

6. That we suggest to the Department of Agriculture the advisability of taking up, when it can, the question of handling and marketing of farm crops, dairy products, vegetables, fruits, etc., with a view of aiding our farmers to put their products on the market in an attractive way and in accordance with such methods as will enable them to obtain the largest prices for them.

7. That the farmers of this State and the South in the death of Dr. Knapp have sustained a severe loss. His services have been appreciated by our people, and we extend to his family our sincere sorrow in their personal bereavement.

8. That this, the North Carolina State Farmers' Convention, now in session assembled, indorse a full Parcels Post bill and request our Representatives and Senators in Congress to give their influence and votes for a parcel post in a manner that will be as helpful to our people as those enjoyed by any other country.

USE OF LIME AGRICULTURALLY.

BY C. B. WILLIAMS.

There is much misuse of lime by a goodly number of farmers because of a misconception as to the action of lime. In many cases where marked results have followed the use of this material the conclusion has been drawn that it is the only one that needs be added to the soil in order to secure large yields annually thereafter. Such a conclusion is not justified by the facts in the case, and if this material is used and depended upon entirely it will be found in time that the beneficial results will gradually grow less. There is no truer saying than that the indiscriminate use of lime enriches the father, but beggars the son if it is depended upon solely for average soils. It should be remembered that, although lime is as essential for plant growth as phosphoric acid, nitrogen, and potash, it is not able to replace any one of these nutrients in the promotion of plant development.

UNDER WHAT CONDITIONS USE.

As a direct plant food for such crops as corn, cotton, and the small grains planted on most of our soils, it is seldom needed; but for leguminous crops, such as the clover, vetch, peas, and alfalfa, its use is usually imperative for the best returns with those soils not well supplied with lime. It might be stated in this connection that as a general rule with most of the upland and coastal soils of the State it is generally necessary to use an application of lime to secure the best results with the growth of leguminous crops. Usually the most marked results with general farm crops have followed the use of lime on soils which have been allowed to get into a bad physical condition or to become sour or acid, either through a large accumulation of organic matter, poor drainage, or insufficient aëration brought on by poor preparation and cultivation, or all combined. The writer has seen applications of lime to soils which have been allowed to get into a sour condition change the yields of corn in one year from a complete failure the previous year to splendid yields the year following the application of lime. In cases like this—and there are many such soils in the State—the chemical and physical conditions of the soil were such that, although the soil had abundant plant food for large yields for many years, yet ordinary crops like corn would not grow to any extent until these conditions were made suitable for their growth. When lime was added it neutralized or destroyed the acidity of the soil, and at the same time improved its physical and chemical condition and biological character to such an extent that afterwards for years the yields were good. Here the beneficial results are largely due to the favorable

action of the lime on the soil rather than in supplying lime as plant food to the crop. In addition to supplying plant food and improving the chemical, biological, and physical conditions of the soil, lime hastens the decomposition of organic matter in the soil, liberating much of the inert or locked-up nitrogen contained in the organic matter of humus. Also, the store of inert potash and phosphoric acid of the soil is acted upon by the lime, and a decidedly larger percentage is brought into an immediately available form annually for plant growth than would have been through ordinary agencies operating in the soils. Hence lime tends to hasten the exhaustion of these constituents of the soil rather than build the soil up, especially when the lime is used alone, continuously, without fertilizer, on poor soil.

Under poor drainage and aëration poisonous iron salts are developed in certain soils, due to the formation of ferrous compounds. The use of lime on such soils renders these toxic salts insoluble and relatively harmless to ordinary farm crops. Iron is a common constituent of our soils and is usually contained in them in a nonpoisonous form.

HOW DETERMINE WHEN LIME IS NEEDED.

If the land contains a large amount of organic matter (usually indicated by dark color of soil) it is fairly safe to assume that such soils, if crops do not yield well on them and they have not received an application of lime or marl in recent years, that they would be benefited by liming or marling.

If sheepsorrel, buttonweed, and the water grasses are growing in the fields, it will usually be found that such soils will respond favorably to applications of lime. If blackberries, raspberries, or gallberries are growing wild on the same type of soil in close proximity to the field in question, it will generally be found that an application of lime will prove beneficial for ordinary crops like corn and the small grains on such a field.

If it is an old field that has been robbed of its humus by continuous cultivation in some clean cultured crop, like cotton, and the soil of which runs together and cements after each rain, it is quite likely to respond profitably to an application of lime, especially for the growth of such crops as clover, vetch, peas, and other legumes. If a heavy growth of some green crop is turned under, especially in the spring, an application of lime or marl should be made before turning, in order to prevent the formation and accumulation of a large amount of organic acids in the soil by the rotting of the crop turned under. If the soil has been poorly drained, and has become tight and water-sogged, lime will in most cases prove highly beneficial when applied soon after drainage and before a crop has been put in. If clover, vetch, cowpeas, and peanuts are to be grown upon ordinary upland soils, it will usually pay to make a good application of lime to the soil, the best results usually following with cowpeas, if the application is made to the crop growing previously on the land; while with peanuts the opposite is frequently true.

If a soil is quite acid, its presence may be determined by means of litmus paper. Take a portion of the soil to be tested into the hand and make it into the consistency of a mud-pie by adding water and working with the hands. Now take a small strip of blue litmus paper, which may be secured from any local drug store, and bury it in the mud-pie. After remaining for a minute or two, remove the litmus paper and wash in clear water, and if the soil is acid or sour the color of the paper will have been changed from the original blue to a red color. Of the commonly grown farm crops, probably oats and Irish potatoes are the most tolerant of large amounts of acidity in the soil.

WHEN APPLY.

Although conditions and systems of rotation will modify to some extent the time of application, yet usually, the safest time to apply this material to the soil will be during the fall or early winter, especially so if either the caustic or water-slaked form is used. If carbonate of lime be employed it may go on in the spring with less danger of injury to the seed of the crop than when

either of the two forms mentioned above is used. When the application is made in the fall, time is afforded for the lime to become well mixed with the soil before spring, especially so if it is put in properly. The carbonate or air-slaked form of lime does not act as energetically as do the quick and water-slaked forms.

HOW APPLY AND AMOUNT.

As a general rule, lime should be applied broadcast and then thoroughly harrowed and disked into the soil. Of slaked lime the quantity required per acre varies quite considerably with different soils, crops, and conditions. Usually, however, the amount necessary to use will vary between 1,000 and 3,000 pounds, or its equivalent of some other form, per acre. Never mix lime, especially in the caustic or water-slaked forms, with any material containing ammonia, before applying it to the soil, because the lime would tend to set free into the atmosphere some of the ammonia, and hence it would be lost. For this reason it is exceedingly unwise to mix lime directly with stable manure. Do not add lime to acid phosphate or to mixtures containing this material, for such a procedure would result in some or all of the available phosphoric acid of the acid phosphate being changed to a less soluble or available form, the amount changed being governed largely by the proportion of lime to acid phosphate in the mixture and by the mechanical condition of the mixture.

When lime is added to permanent pastures and meadows it should be applied broadcast in the fall or early winter and left on the surface. For this purpose the carbonate form will usually be found best suited.

FORMS OF LIME AND THEIR EQUIVALENTS.

There are three chemical forms of lime used commercially other than gypsum (land plaster) or sulphate of lime. Each of these forms is known by a goodly number of names. The forms and synonymous names are as follows:

- (1) Caustic, quick, burnt, builders', rock, stone, or unslaked lime.
- (2) Carbonate, agricultural, marble, limestone, marl, chalk, calcite, or air-slaked.
- (3) Water-slaked or hydrated lime.

As all three of these forms of lime are suited for agricultural purposes, it becomes important in purchasing to know the relative equivalents in actual lime (calcium oxide). When 178 pounds of a good grade of carbonate of lime is burnt in the kiln about 100 pounds of quick or caustic lime is secured; the remaining 78 pounds of the original substance is driven off into the atmosphere as carbon dioxide or carbonate acid gas. If the above 100 pounds of quicklime, secured by burning, is exposed to the atmosphere for some time, it will absorb carbon dioxide again from the air, and will, when fully saturated with it, weigh 178 pounds. If 56 pounds of the burnt lime is water-slaked with just enough water to complete the chemical change, the resulting hydrated or water-slaked lime will weigh about 74 pounds. In other words, 100 pounds of quicklime will take up in chemical combination about 32 pounds of water, thereby increasing its weight about one-third by water-slaking.

From the above it may be seen that the most concentrated form of lime is the caustic or burnt lime. This being so, where the lime has to be freighted long distances on the railroad or hauled several miles on country roads, or both, it will usually be found that this will be a cheaper form in which to buy lime, but not always. For instance, the freight on a car-load of carbonate of lime (agricultural lime, so called) will be the same as that on the same amount of quick or burnt lime, yet there would be almost twice as much actual lime (calcium oxide) in the latter as in the former; hence the freight on the lime contained in the quick form would be only about one-half of what the actual lime contained in the carbonate form costs per ton.

In securing quotations on lime, do so upon percentage composition of calcium oxide and upon delivery at your nearest railroad station. If they are secured in this way it will not be difficult to decide from whom to purchase. If these precautions are not observed it will not always be easy to decide which will

be the cheapest source from which to secure one's supply of lime. One bushel of good stone or rock lime will weigh about 90 pounds, and when slaked will produce about three bushels of slaked lime, which will weigh approximately 45 pounds per bushel.

Pure burnt oyster-shell lime weighs about 60 pounds to the bushel. When it is slaked about two and one-half bushels of slaked lime is formed, which will weigh about 40 pounds per bushel.

DEEP BREAKING OF LAND.

By C. R. HUDSON.

For a considerable number of years Southern farmers have been trying to produce large, profitable crops of corn on shallow soils. The records of corn growing show that they have failed. During this same period a few of the more progressive farmers have been breaking their lands from 6 to 8 inches, and even to 10 inches deep, and have produced from 20 to 60 bushels per acre at a small cost. For forty years the average depth of breaking land in North Carolina has been less than 4 inches, with an average yield of about 15 bushels of corn per acre. Last year the men engaged in Demonstration Work in North Carolina broke 3,000 acres from 6 to 10 inches deep and harvested a little over 40 bushels per acre. The cost was about 25 cents per bushel.

Can we not learn a valuable lesson from the experience of these farmers? Let us study, briefly, some of the advantages of a deep soil. One of the most important problems connected with crop growing is a properly distributed supply of moisture. We cannot have this on shallow soils. The shallow soil is soon filled with water during rainfall. If the rains continue several days, the soil stays saturated with water. This keeps out the air. (Two things cannot occupy the same space at the same time.) Crops will not grow very long unless air gets down into the soil. Therefore the crop fails during wet spells of weather. The excess of rainfall usually does much washing under such conditions. When the rains cease, the small amount of water held in a shallow soil is soon exhausted by evaporation and by being used by the crop so that the crop now suffers for lack of moisture. With a deep soil these conditions do not exist. When rain comes it sinks down into the lower parts of the deep soil, letting the air into the upper portions so that the plants continue their growth. When dry weather prevails the deep soil, by having caught previous rains, is able to supply moisture enough to keep the crop green and growing. When the shallow soil is wet it is usually too wet, and when dry, too dry.

In this section we nearly always have a wet spell or a dry spell of weather during the period of crop growing. One usually follows the other. The effects of both extremes can be largely overcome by having a deep seedbed. Then, too, it stands to reason that there is more plant food in a deep soil than in a shallow one. Again, the presence of heat, air, and moisture are essential to chemical and germ action in the preparation of plant food in the soil. In fact, our soils have been formed and are still being formed by the action of these agencies. For this reason we say that we have soil no deeper than we plow. The depths to which these penetrate in the ordinary soils are dependent upon the depth of plowing. It has been proven that the roots of plants penetrate deeper and feed deeper in deeply plowed land. These things being true, we may say that a 4-inch soil has 4 inches of plant food, while an 8-inch soil has 8 inches of plant food. As a matter of fact, however, we find that usually the lower portions of the deep soil do not contain as much plant food as the upper portions. This is because they have not been loosened up so long, and hence have not had time to go through as much weathering.

The most essential condition for a fertile soil is a constant supply of moisture, so that a film of water can envelop the soil particles and absorb nutri-

tive elements. The hair roots of plants drink this nourishment. Since plants take up food only in a liquid form, we can readily see that although we may apply a ton of fertilizer per acre, yet the plants cannot use it if there is no moisture present to dissolve the fertilizer. Plants use an enormous quantity of water. An acre of good corn, for instance, will absorb and evaporate about 10 inches of water. About three-fourths of this will be required during the last seventy-five days of its growth. It is very seldom that this amount of rain falls during that period, and of what does fall much is lost by evaporation from the soil itself, and often much of it is lost by surface drainage. So we know that it is impossible for a 4-inch soil to furnish sufficient moisture for a maximum crop during a normal season. The remedy for this, then, is to deepen the soil by plowing so that it will have a greater storage capacity for water. Shallow and generally poorly prepared seedbeds are the principal causes of the low yields of corn in the South. They also affect cotton and other crops similarly, although not to so great an extent.

The time and method of deep plowing and the condition of the soil and subsoil when the plowing is done are important. As a general rule, fall and early winter plowing are much better for deep plowing than spring; in fall plowing the soil has a chance for several months weathering before spring planting begins; it has an opportunity to catch and store the winter rains; it reduces the amount of breaking to be done when the rush of spring work comes on. To a considerable extent it prevents washing and leaching, and the soil has time to settle and produce a firm seedbed. One of the principal objections to deep plowing in the spring is, we can hardly ever find the soil and subsoil in condition to plow at the same time. When the surface soil has dried sufficiently for plowing the subsoil is still usually too wet to plow. By the time the subsoil is dry enough to plow the surface soil is often so dry that it breaks into clods. If, however, soil can be found in proper condition it is all right to plow deep at any season. In no case should plowing be done when either the surface soil or the subsoil is too wet. Very little of the subsoil should be thrown out on top at any one plowing.

As to the implements to use for deep breaking, it makes very little difference which is used, just so it does the work easily and does not invert the soil too much. One of the best implements for this work is the disc plow. This goes into the earth easily, and does not entirely invert the furrow slice, but sets it on edge. The ordinary subsoil plow does good work of this character. Where neither of these is at hand a very common practice is to run two ordinary plows one behind the other and in the same furrow. The second plow, in this case, should be one without turning facilities. The objection to this method is its expense.

Some exceptions should be noted in regard to the above statements concerning deep plowing. Land with a deep porous subsoil is not usually benefited by deep plowing. Very deep, coarse, sandy soils do not need deep plowing unless considerable humus is to be turned under. In that case the humus should be buried deeply so as to act as a subsoil. Soils that are water-logged or that are badly in need of drainage are rarely benefited by deep plowing except in extremely dry seasons. If such soils were underdrained they would usually respond well to deep plowing. Many marshes, bogs, and other low, wet soils would produce big crops if they were drained and deepened by plowing.

SOIL IMPROVEMENT.

BY C. L. NEWMAN.

This is a subject which, from an economic point of view, affects the farmer to a greater extent than does any other which bears upon farming as a business. The surface of the earth is the base of all of man's activities on earth. His sphere of influence is almost limited to the surface, since he neither

operates far below or far above this surface. Man and his animals move and have their being upon the surface. Plants, which sustain both man and his animals, are fixed and have their being upon the surface of the earth, and draw their sustenance from the shallow crust and the air. Animals are dependent upon plants, and plants control their existence. Plants are dependent upon the soil, and the condition and composition of the soil controls the kinds and quantities of plants that may spring from it. It is evident, then, that we must depend upon the soil for the production of plants, upon plants for the production of animals, and upon both plants and animals for the sustenance of man. With all this responsibility resting upon the soil, it is evident that the condition of the soil and its ability to produce plants or crops is a matter of first consideration for the individual, for the State, for the Nation, and for the entire world, since man and his activities are primarily with the soil.

The man who tills the soil has the greatest of responsibilities resting upon him. He is responsible for the feeding and clothing of the world and for keeping his soil in such condition as will enable him to continue to feed and clothe as the demand for increased quantities of food and clothing grows greater and greater. No man has the right to allow, through ignorance or carelessness, his soil to become poorer year after year. He who does this, is neglectful of those who are dependent upon him, is unpatriotic to his Nation, and is recreant to a Divine trust.

The capacity of a soil for production is controlled by its chemical composition and its physical condition, both of which may be marvelously affected by the man who tills the soil. It is no uncommon sight to see two areas of soil within a few feet of each other, one producing abundantly and the other barely at all, though originally these two areas may have had the same physical condition.

Nature, in either the even or uneven tenor of her way, has many hidden secrets, and many, many lessons are spread before man that he may read them. It is man's mission to know nature better and better as time passes and he finds a better knowledge of her laws of great good.

A casual glance at the condition of our farming lands as it was found upon the discovery of America will show that nature was then, all over North Carolina, cultivating the crop of her choice. This crop had for centuries been growing and year by year approaching nearer to perfection. Under these natural conditions this crop, the forest, was mature and self-supporting and self-perpetuating. Each year in the leaves, fruit, twigs, and bark that fell upon the floor of the forest was as much mineral plant food as each year was taken from the soil for the support of the forest. This mineral plant food was associated with a larger bulk of "organic matter" accumulated upon the floor of the forest in a never-decreasing mulch.

Each year this accumulating mulch was added to and each year the lower layers decomposed and liberated the plant food that the rains might return it into the soil and within the reach of the roots of the forest. This "over and over again" kept up a balanced condition of soil fertility and a uniform, regular, and never-failing growth. There was always an abundance of soluble plant food and plant food in the proportion demanded by the growing crop, since its origin was largely from the discarded parts of the crop of trees to which it was to be returned.

This covering of vegetation served another and equally important function, in that it modified the temperature of the soil, keeping it warmer in the winter and cooler in the summer, and checked all excesses. The rainfall, modified and regulated by the forest, fell upon a bed of leaves and was all taken up, to be allowed to slowly sink into the soil and be stored for the use of the forest in abundant and never-failing quantities.

When the forest was cleared for the use of man the annual addition to the humus-forming material ceased and the accumulated supply (if not burned when the forest was cleared) rapidly disappeared by decomposition through the first few years of cultivation. Thus was destroyed not only the ever present supply of plant food, but with it the conditions which were instru-

mental in maintaining an ever present water supply disappeared also. But little effort has been made by the farmer to restore these materials and conditions so necessary to crop production.

This ever present large supply of humus-forming materials also served most efficiently to preserve the soil itself from being washed away. When it disappeared the soil wash was hastened by the tillage practice so common with cotton, tobacco, and corn, the three principal crops of the State.

These crops, without any reason for such a practice, are planted on high beds which aid in soil-wash. Without rotation the culture of these three crops is such as to prevent the formation of humus in the soil. The inferior plows used for preparing for the staple crops and the sorry animals which draw the plows, together, have conspired to aid in the disastrous practice of shallow plowing—a practice which prevents the full use of the natural resources of the soil and aid in its being washed away. The field which is year after year plowed to the same depth has formed at the bottom of the furrow a hard-pan which locks beneath the soil turned the unused mineral elements of plant food, prevents the deeper penetration of the roots of growing crops, and checks the flow of water into the soil. The average depth of plowing in the State can hardly be more than 4 inches, and the turning over and over again year after year of this shallow 4 inches forces the growing crops and the leaching effects of the fallen rain to exhaust it. When heavy rains fall the prepared 4 inches becomes filled with water which cannot go deeper, since the many passages of the plow over the same subsurface have sealed it.

As soon as the 4 inches is full of water, the particles of the soil are partly lifted by the water, and, the water occupying all the spaces between the soil particles, lubricates them, so to speak. With such conditions, on soils that have any fall, the water must flow off, since it cannot percolate down; and, flowing off, washes away the soil, the vegetable matter plowed down and the commercial fertilizers used in North Carolina at an annual cost of twelve millions of dollars. Gullies form, fields are abandoned, and broomsedge, briars, and finally pine take the place of cotton, tobacco, and corn. The soil drifts down the branches to the creeks and on to the rivers and by the rivers is emptied into the harbors along the Atlantic coast, where it costs the National Government millions of dollars for its dredging from the harbors. Soil wash costs the State annually more than all the fires cost. It is the most expensive drain upon the resources of the State, and every patriotic citizen should strive to check it. If any man should burn his residence or barn he would be prosecuted for arson, yet a greater destruction of the State's resources is going on in the washing away of the soil on the farms of the State, and the offenders are not prosecuted. The soil is God-given, and we have no right to allow its destruction.

The average farmer has come to look upon the use of commercial fertilizers as the only means by which he may increase crop production, and seems to have overlooked the benefits that he may secure from the more direct treatment of the soil itself. Soil treatment aims at the conservation of the soil itself, the improvement of its physical condition and the liberation of the "locked up" elements of plant food which naturally exist in the soil. The two main things which any farmer can do to bring about these conditions are deeper plowing and the adding of a permanent supply of humus to the soil. Having accomplished these, the other things necessary to high yields and profitable yields will naturally follow.

If a soil has been plowed year after year to the depth of 4 inches only, this 4 inches has been prepared for the use of the crop, and to a great extent the crop has limited its root activity to this 4 inches of depth, and the immense store of plant foods underneath remain unused. Should this soil be broken to 8 inches instead of 4, and brought to as good a condition of tilth as the first 4 inches, the area available for the exercise of the functions of the roots of the plants would be doubled, or in practice more than doubled, since the 8 inches would protect the plant and its roots from extremes of change to which the soil nearer the surface is subjected. Eight inches of soil will hold twice

as much water as 4 inches and thus aid in tiding over drought, as well as taking up and storing away a surplus of rain which would otherwise flow off and wash the soil. Vegetable matter distributed through 8 inches of soil would not be lost so rapidly by decomposition. The bringing nearer to the surface the undissolved deeper layer will enable nature's elements to prepare the plant food it contains for the use of the crop. If this lower layer is brought up in late fall or in midwinter the oxygen, carbon dioxide, and other constituents of the air will act upon it and dissolve it. The contraction and expansion incident to freezing and thawing will "crush asunder" the particles and expose fresh surfaces to be acted upon. The moisture will dissolve, with the aid of the juices of decomposing plants, and prepare for the use of crops these newly elevated sources of plant food, and with no more labor and no more expense the proverbial two blades of grass will grow where one grew before.

An abundant supply of water for a growing crop is necessary for good yields. The treatment accorded a soil not only determines how much rain water the soil will take up, but how little will be allowed to flow off and carry the soil with it. Further, the treatment of the soil controlling its condition, also determines how much of this moisture will be retained in the soil and how freely it may travel back to within reach of the root plants.

An illustration will give some idea of the increased capacity for water a soil may secure by having its particles reduced in size: The soil holds its water on the surface of the soil particles. The water covers the surface of the individual soil particles and travels by passing from the surface of one to another particle. The gross surface area of the particles, therefore, controls the quantity of water a given soil may hold, other things being equal. If a cubic inch of stone be immersed in water and then withdrawn, its 6 square inches of surface will be covered with water. Now, if this cube of stone be cut into 100 slices there will be 200 more square inch surfaces exposed. If cut again, 100 times again at right angles to the first cut an additional 200 square inches of surface will be exposed. If cut still again and at right angles to the first two cuts, there will be another 200 square inches of surface exposed; and these, with the original six, make 606 square inches of surface where there were only 6 to begin with. Thus there has been added a like increase in the exposure of soil surface for the action of the elements of nature in dissolving the plant food and a like increase in surface for the holding of water. In other words, there would be 606 square inches of surface where there were but 6; and, as the activities of man and all animate nature is largely confined to the surface of the earth, so also are the activities of the roots of plants confined to the surface of the soil particles. Any increase of the soil's surface area increases its capacity for both plant food and water. The proper treatment of the soil at the right time will rapidly multiply the surface area of the soil particles; or, its improper treatment may have the opposite effect.

It is evident that too small a portion of the soil under cultivation is made usable for plant activities or for holding water. The plowing of the fields when preparation for planting is being done is too shallow and too little effort is directed towards the making of a good seedbed. The practice of waiting until early spring is disastrous alike to the good physical condition of the soil and to good crop yields.

Fall and winter plowing has the great advantage of elevating the lower strata of the soil and the upper strata of the subsoil and exposing them to the repeated freezing and thawing of winter, to the air and to the many other changes which take place more rapidly near the surface. Until the desired depth is reached the soil should be plowed from 20 to 40 per cent deeper each fall or winter. The plow used for this purpose should be one that does not invert the plow-slice, but should turn it so that it rests on its edge or at an angle of about 44 degrees. This aids in securing a more uniform texture to the soil, gives a better incorporation of vegetable matter in the soil, and enables more rain water to enter and be well distributed in the soil. The good effects of fall or winter plowing are greatly increased by the addition of quantities of vegetable matter either in the form of crops or of stable manure. Such vegetable matter not only contains plant food, but its cellular

structure enables it to act as a sponge and thus increases the soil capacity for water; and the decomposition of vegetable matter forms solvents which act upon the mineral matter of the soil and render it available to the plants.

Rotations involving the alteration of fibrous and tap-rooted plants, broadcast and rowed crops, winter and summer cover crops and the employment of legumes at frequent intervals will not only bring about diversification, soil improvement, and enable the keeping of more live stock, but will enable a better economic balance of the products of the farm and greater profit in their utilization on the farm or their sale. The development of a high state of soil fertility cannot be secured by one act, but must come from many acts harmonizing, such as deeper fall and winter plowing followed by disking and harrowing, the reduction of soil-wash to a minimum; the employment of a wise rotation and cover and catch crops; increased numbers of live stock and the economic use of their droppings; and the proper use of the right kind of commercial fertilizing elements.

SOIL IMPROVEMENT WITH GREEN MANURE.

BY J. M. GRAY.

By green manure we mean any crop that is grown primarily for the purpose of improvement of the soil, and not for the harvested product.

In preparing a green manure crop for the future crop there are several important factors we must keep ever before us. We want the cover crop to furnish direct plant food, indirect plant food, increase the moisture-holding capacity of the soil, and to better the mechanical condition of the soil. And we want these results at once. We cannot get these results without giving some care and thought to the preparation of the land. If we want to obtain the best results we must have the vegetation furnished by the crop thoroughly mixed with the surface soil, and not in the bottom of the furrow, as many of our farmers are wont to do. Many farmers believe that by turning this crop under in any form they will get good results, while others have tried it and know that they do not get the best results from careless handling of these crops.

Let us consider for a few minutes the following factors: increasing the water-holding capacity of the soil, direct plant food, indirect plant food, and the mechanical condition of the soil, in the order in which they come.

Just a word about the soil water, to make our next statements clear. In the soil there are two movements of the water: the gravity water or that water which falls on the land in the form of rain, etc., and flows downward until it reaches the water-table or the underdrains, and the capillary water, or the water which starts from this water-table and moves upward from soil particle to soil particle (much as the oil flows upward through the lamp wick), and, unless checked by a dust mulch or some other agency, escapes from the surface in the form of a thin vapor. Before plant food in the soil can be utilized by the plants it must be in solution, and we are dependent upon this capillary water to dissolve the plant food; therefore you can see the necessity of husbanding capillary water.

The usual method of preparing the green manure crop for a future crop is to go into the field with a heavy plow and to turn the vegetation completely over, placing it in the bottom of the furrow and thus forming a cushion of vegetation between the surface soil and the subsoil. This vegetation, no matter how firmly we think we have packed it, cannot be close enough together to allow the capillary movement of the water to continue from the subsoil to the surface soil or seedbed. In this one operation we are cutting off from the plant the most important factor in its growth. Of course, in a rainy season we may not notice this injury so much, for possibly the water-table has been raised up to or above the cushion of vegetation; but in a dry season we will see that our crops, where we have turned into the bottom of the fur-

row a lot of vegetation, are injured by the drought more than where we did not have a cover crop. The reason is obvious: the water supply is broken; not the fault of the cover crop, however, but of the faulty manner in which it was put in. Later we will explain the method of preventing this injury.

Vegetation increases the water-holding capacity of soil. When it is thoroughly mixed with the surface soil it acts very much as a sponge and absorbs the excess moisture in the soil and holds it in reserve for the future needs of the plant instead of letting it escape out of the land by surface evaporation and underdrains, as it would otherwise do. When we consider that it takes about 200 pounds of water to develop one pound of dry matter in corn (stalk and ears) we can see the necessity of plenty of water if we expect large yields.

Then, too, the cover crop adds direct plant food. Every plant is nothing more nor less than a combination of different plant foods, and when a plant is put back into the soil it decays and disintegrates into the original elements or plant foods. Now, when we put this vegetation in the bottom of the furrow we place it where it will decay slowly; in fact, in some instances requiring several years to become available as plant food. This is because the bacteria and other organisms, whose work it is to take this vegetation and put it in an available form for the plant, cannot get to this vegetation readily. When it is finally broken down by the few agents that can touch it from the topsoil, it is down below the main feeding area of the plant roots, and, therefore, is of little benefit to the plants. What we want, then, is to get this vegetation thoroughly mixed with the surface soil so that the beneficial bacteria and organisms throughout the soil can quickly put it in an available form.

Indirectly, vegetation adds plant food to the soil by providing a feeding and breeding ground for the beneficial bacteria and organisms in the soil. Just a word about the bacteria and organisms in the soil. In all of our soils we have two kinds of these organisms, the beneficial and the harmful. The harmful ones cause the plant food that is originally in the soil to be so changed that it is in an unavailable form or in a form which the plants cannot use. In this way the harmful agents can so destroy the plant food in the soil that a soil naturally fertile enough to produce good crops will become very unproductive. The beneficial organisms work in just the opposite way. These put in an available form the plant food which is in the soil. Thus it is that sometimes just by the application of a good supply of humus-forming material, preferably a leguminous crop, we get unusually large crop returns from the following crop. And again you can see the absolute necessity of having this humus well mixed with the surface soil instead of in the bottom of the furrow.

Mechanically, humus aids in improving the soil by being thoroughly mixed in between the soil particles, in that in our clay soils it holds the soil particles apart and in our sandy soils it helps to hold the soil particles together. In our clay soils the soil particles, which make up the soil, have a tendency to run together, causing the soils to harden and cake, making it very difficult to break them up and to keep the soil in a fine, loose condition. But with plenty of humus in the soil these particles are held apart and the land is more open and porous. It is much easier tilled and the soil agents can improve the soil more effectively. And again in the sandy soils this humus tends to hold the loose particles together more compactly and prevents them from losing so much fertility from leaching, and also gets the land in a much better tillable condition and a condition that helps the beneficial soil agents to get in their work. You see, again, the necessity of having the vegetation well mixed with the surface soil and not in the bottom of the furrow where many farmers have been putting it.

How are we going to get the vegetation mixed with the soil? The chief reason the farmer gives for putting this vegetation in the bottom of the furrow is to get it out of the way of future cultivation. But it is possible to get this result without the disastrous results that have often followed the common practice of turning under the crop.

The first thing to do with land that has grown a cover crop, whether the crop was used for hay or not, is to get on it with a disk or cut-away harrow and to thoroughly cut to pieces the upper two or three inches of surface soil,

together with the vegetation. This done, you are ready to get on it with a plow. But in plowing you must not turn the land completely over, but edge it up. This may be a little difficult at first, but with a short mold board or by narrowing the width of the furrows it can be done. The object of this edging is to keep the surface soil, which is the richest and the best adapted to plant growth, on top, and also to keep the vegetation which is mixed with the surface soil up where it will do the most good. As soon as you have plowed the land you should get on it with the disk harrow again; because if you do not you are leaving this soil in a rough, uneven condition, with a large amount of surface exposed to the sun and wind, and a great deal of water is going to be lost by evaporation and the uneven ends of the soil are going to dry out and harden, forming clods which might later be almost impossible to pulverize. Therefore, it is essential that you level down the surface of the land and in this way prevent a large amount of water from escaping; also that you pulverize the surface and in this way prevent the formation of clods, "which, being interpreted," means a large amount of unavailable plant food. Then if you do not plant at once it is best to run over the ground again in a few days with a harrow to prevent the formation of a crust and to keep the seedbed in good condition for the future planting.

If you have done this thoroughly your soil will be in a much better condition to withstand droughts and to furnish the plant food for the crop, and will make future cultivation of the crop easier, because you have increased the moisture-holding capacity of the soil; you have added direct plant food; you have added indirect plant food; and you have greatly improved the mechanical condition of the soil.

It may be well to add from 1,000 to 2,000 pounds of lime to the land per acre, if you have it, at the first harrowing after plowing. This may not be essential in limestone soils, but is advisable wherever acid soils occur, and most of our North Carolina soils are more or less acid.

IMPROVING THE TEXTURE OF SOILS.

By E. S. MILLSAPS.

All soils are formed from the disintegration of the original rocks, and are classified according to the composition of the mother rock and the amount of organic matter they contain. The composition of our uplands is practically the same as the underlying rocks, while that of our valleys or plains may be entirely different, according to the amount of matter washed down from the hills.

Soil is valuable according to the amount of plant food it contains, and this quality is determined largely by the fineness of the soil particles and the amount of organic decay contained in it. How fine these particles may be depends upon the character of the original rock and how well the natural agents have done their work. These agents are air, sunshine, rain, and frost, and the work of the nitrifying bacteria in the soil. When all these agents have performed their work well, we have a soil that is open, porous, and spongy. It absorbs moisture like a sponge. The capacity of an absorbent is measured by the fineness and character of its constituent elements. Thus a soil composed of very fine particles of original matter and well filled with decaying vegetable matter is a good absorbent. It is a living soil. Every condition exists for the liberation of plant food. It permits the free circulation of air containing the life-giving oxygen and carbon dioxide. Its mechanical or textural condition is ideal. Such a soil is the home of the low forms of plant life upon which the bacterial life of a good soil depends.

The absence of such soil conditions gives us a dead soil. It runs together and bakes hard after rains, thus smothering out the minute organisms whose life-work consists in transforming organic matter into forms adapted to the use of plants.

There are two ways of improving the mechanical condition of soil—the natural and the artificial. The natural method is used by Mother Nature. When land is run down and unproductive, it is frequently left idle, and nature immediately begins a process of renovation by starting a growth of plants upon it. These plants grow and decay as the seasons go by, leaving layer upon layer of vegetable mould which decays and furnishes additional food for a more abundant plant growth. Trees finally appear upon the once unproductive field. Their roots penetrate the soil and open the way for water and air. Their limbs spread wider each year and the leaves fall to the ground, adding more and more vegetable matter to the soil.

The second, or artificial method, is that followed by man in his dominion over matter and his knowledge of the use of those agencies employed by nature. Instead of waiting for frost and the roots of plants to open up the soil, the farmer breaks it up with tools and machinery, thus encouraging a more rapid breaking down of the soil particles and the growth and decay of plant life. As this organic decay unites with the soil, it becomes darker, bacterial life multiplies, and nitrification is encouraged. No farmer, no matter how clever he may be, can produce ideal conditions in his soil without the assistance of nature's forces, but with his knowledge of these forces he is enabled to assist nature in her work. He breaks up his land so that the sun, air, and frost may pulverize it, and his knowledge of the soil-improving plants enables him to plant such seeds as will more rapidly furnish the required vegetable matter. He may accomplish in a short time what it took nature many long years to bring about.

In proportion as the farmer promotes these conditions in his soil its texture will be improved, and as necessary steps in promoting these conditions we will mention deep plowing, a systematic rotation of crops, green manuring, barnyard manures, and sometimes the application of lime. As plowing is a means of improving the mechanical condition of soil, it might be well to add a word as to the time when it should be done. Land should never be plowed when too wet or when it is so dry as to break up cloddy. Land is in ideal plow condition when it readily falls apart and crumbles after the plow. A lumpy or cloddy soil is very undesirable, as it permits rapid evaporation and a too free circulation of air.

Another important consideration in improving the mechanical condition of soils is drainage. No soil can be made productive or brought into ideal mechanical condition if it is constantly soaked with soil water. A water-filled soil shuts out the air and prevents nitrification by the drowning of the bacteria. One of the first efforts, in a wet soil, is to secure good drainage.

Humus? Some one has said give humus a rest. Then what shall we do? We may call a rose by any other name and it smells as sweet. We call it organic decay, vegetable matter, or humus. It does not matter. It is the crying need of the soil. Without it we have a dead soil. With it we have a living, active soil. Humus *has* had a rest. The rest has been so long and so persistent that our soils are burned out and lifeless. I know of no way to give life to a dead soil except by adding humus, and that abundantly.

Clay soils should be plowed in the fall or early winter; the earlier the better. It should be done with two to four horses and the furrows left on edge, or at an angle of 45 degrees, so that the frost action may pulverize and break down the soil particles. Plowing is valuable chiefly because it enables the forces of nature to do their work more effectively. Year by year this good plowing should be done, and a crop of vegetable matter should be turned under each time. Preferably this should be of the leguminous plants, such as cowpeas, soy beans, the vetches, and the clovers. These plants have the peculiar characteristic of encouraging the growth of the nitrogen-gathering bacteria in the soil, and thus adding valuable plant food, while at the same time they are filling the soil with the organic decay so necessary to improve its condition. There are other plants, the tame grasses, which are also desira-

ble as producers of humus. In addition to the plants herein named as desirable producers of humus, the making and spreading upon the land of large quantities of barnyard manure must not be neglected. Besides the value of stable manure as containing plant food and humus, it encourages the growth of soil bacteria.

The farmer who faithfully carries out the methods of soil improvement as outlined herein for a period of years will have little to complain of as to the textural condition of his soil.

THE RELATION OF SOIL MOISTURE TO SOIL FERTILITY.

By T. J. W. BROOME.

The relation of moisture to soil fertility, and ways and means for increasing the water-holding capacity of the soil, have not received the consideration from most farmers that their importance demands. Water is the most important factor in crop production. Eighty to 90 per cent of all plants is water. Plants require and take all their food in solution with water. Water is itself a plant-food substance. The micro-organisms which are necessary to and abound in all productive soils require a wholesome supply of soil moisture; otherwise they cannot perform properly their functions in the soil. Three to four hundred pounds of water are required to produce a pound of dry matter; more is required on poor land; that is, this amount of water must pass from the soil upward through the plant. Although there may be an abundance of plant food in the soil, when moisture is deficient the plant goes hungry, and lean crops are the result. It is said that the crops of the United States are more frequently cut short by an insufficiency of moisture than from any other cause. These losses occur not in periods of great drouth only, such as we are now passing through, but in years of normal rainfall a drouth of two or three weeks duration, at a time when the crop requires most moisture, very materially reduces the yield. The cause for much of the loss in this way is directly traceable to careless or indifferent management of the soil in regard to moisture. That a large part of this annual loss, which is accredited to the drouths, can be averted is too evident to admit of debate.

North Carolina farmers cultivated last year, 1910, in round numbers, 3,000,000 acres in corn. It does not take a very severe drouth to reduce the yield by one bushel per acre, or by five bushels on much of the farm lands of the State. Now, if by a little care we can increase the water-holding capacity of the soil to the extent that one bushel more per acre can be produced, which will only be about 28,000 pounds of water—equal to about one-eighth inch rainfall—the wealth of the State will be increased to the extent of the value of 3,000,000 bushels of corn—two and a quarter million dollars at present prices.

King has found that a soil, plowed late in the fall, contained on the 14th of the following May 130.6 tons more water per acre than a similar soil unplowed in the fall, both fields remaining untouched in spring until May 14th. This increased amount of water in the fall-plowed field is equal to the amount of water removed from the soil in the production of $9\frac{1}{2}$ bushels of corn. If we cut these figures practically in half, and say that this increased quantity of soil moisture is capable of producing 5 bushels more per acre, this would mean 15,000,000 bushels added to the corn crop of North Carolina.

Can we increase the water-holding capacity of North Carolina corn lands to the extent that 5 bushels more corn per acre can be produced? Is this too much to hope for from this source? Has the importance of a little moisture been overestimated? We think not. There are demonstrations in almost every section of the State which are conclusive on this point. We have seen, this

summer, fields that were partly broken last fall and the remainder broken this spring, and there is all the promise of 5 to 15 bushels more corn per acre, due wholly to the presence of more moisture and better mechanical condition in the fall-plowed land.

The average annual rainfall in North Carolina is sufficient for the sustaining of large yields of all crops as to moisture requirements. Crops require large quantities of water for a comparatively short period, and it often happens that the rainfall is most deficient when they require most moisture. Wheat and oats, for instance, which mature from first to middle of June, require and must have an abundant supply of moisture the last six weeks of their growth, if a maximum crop is produced. And it frequently happens that very little rain falls during this period. Corn and cotton demand most moisture during the six or eight weeks prior to maturity, and usually drouths are most severe at this time. And even with a normal rainfall at this time, these crops frequently suffer because of insufficiency of moisture in the soil.

Information is often sought as to the relative quantities of plant food to apply to the soil, and in what amount to produce 50 or 100 bushels corn per acre. The first provision should always be for a bountiful and healthful moisture supply; having this, or the conditions which practically assure it, the growing of bountiful crops is assured when the proper amount of plant food is supplied.

In order that crops may be supplied with sufficient moisture in time of drouth, and when needed in greatest abundance, the storage capacity of the soil must be enlarged, and the winter and early spring rains stored away and conserved by tillage until used by the crops. Just as the honeybee gathers honey while honey-making material is plentiful, and stores away for use against the time when nature cuts off the supply; or as the provident farmer garners his crops at harvest time, that his family and stock may be amply provided for until harvest comes again; so may we solve the problem of moisture—by making ample provision for the future while there is plenty.

The principal ways by which the moisture-holding capacity of the soil can be increased are deep fall plowing, underdrainage, and the adding of humus-making material. To get the full benefit of the rainfall it must pass downward through the soil. That which runs off over the surface is useless to agriculture, and is often very injurious. On close and compact soils, a large percentage of the water moves off over the surface during the winter and early spring. The soil should be put in condition in the fall and early winter to receive the winter rains. If the soil is close and compact, it should be broken deeply, and let lie rough and uneven as left by the plow, that the rain water may find ready entrance into the soil. If there is danger of surface erosion, and the plowing is done early, rye, wheat, oats, or barley can be sown in front of the plow. The plants assist in holding the water, and the roots bind the soil and prevent washing.

Plants, in order to get the moisture required in the production of maximum crops, must have a deep and extensive root system. A strong and vigorous root system enables them to receive more moisture, and consequently more plant food in times of drouth. King finds in an experiment conducted with four stalks of corn, just as they were coming into tassel and their ears were forming, that in thirteen days they removed from the soil 150.6 pounds of water, a daily average of nearly three pounds per day for each stalk; and this from a soil so dry that no amount of pressure could express from it a drop of water. These plants had a strong, vigorous, and extensive root system, otherwise they could not have derived this amount of water from the soil, or the plant food demanded, in the time stated, and "firing" of the blades would have resulted.

Underdrainage and deep plowing, apart from preparing the soil to receive and hold more moisture, prepare a deeper seedbed, a larger pasturage for the roots of plants, thereby encouraging the development of a strong, deep, and vigorous root growth.

Some soils have larger capacity for holding water than others, as is shown in the following table:

100 pounds sand	will hold	25 pounds water.
100 pounds sandy loam	will hold	40 pounds water.
100 pounds clay loam	will hold	50 pounds water.
100 pounds stiff clay	will hold	61½ pounds water.
100 pounds humus	will hold	181 pounds water.

By this table we see that humus will add greatly to the moisture-holding capacity of the soil, as well as performing several other important functions. The humus content of the soil can be kept up in many ways, as has been and will yet be brought out in other papers upon the subject of soil improvement. It is obtained through crop residues, by plowing under green crops, by growing catch crops when the land is not otherwise occupied, and by the application of barn manures.

For the encouragement of the sandy land farmer, it may be noted that King has found that while sandy soils do not hold as much moisture as do the clay soils, they yield a larger per cent of what is held to the crop, making the amount of water available to the plants more nearly equal in the two soils.

Underdrainage benefits the soil in many ways. As it relates to increased moisture capacity it makes the soil more porous, permitting the water to sink more readily into the soil. It permits the soil to be stirred earlier in the spring, thus checking the evaporation of valuable moisture. It also increases the capillary area of the soil by making it deeper and mellow, causing it to pulverize easily, a very essential condition. A fine, mellow soil will hold more moisture than will a hard, lumpy one.

If we would grow large crops, which are a result of the best use of soil moisture, there is no one thing more important for the farmer to strive for than the earliest possible stirring of the soil in the spring, after the land has sufficiently dried that injury will not be done. When the soil is close and compact as left by the winter and early spring rains, and the spring winds begin to blow, evaporation is rapid, and many tons of water are taken up daily from the soil.

In an experiment conducted for the purpose of measuring the influence of early spring plowing on the loss of water from the soil, King finds as follows:

On April 28th a piece of corn land was plowed; the next day samples of this soil were taken in 1-foot sections to a depth of 4 feet, and the percentage of moisture determined. Seven days later, May 6th, samples were again taken as before and the percentage of moisture noted. There was no appreciable change in the moisture content of the soil during the seven days. Adjoining this piece of land and separated from it by strip of grass 10 feet wide, lay another piece of land which was not plowed until May 6th, and on this date before plowing samples of the soil were taken as before, and the percentage of moisture ascertained as in the first instance. The experiment showed that the unplowed land had lost 9.13 pounds more water per square foot than had the plowed ground, an amount equal to 1¾ inches of rain, and more than 198 tons of water per acre. Another serious result followed the delayed plowing. The land broke up in large clods. So that instead of having the soil in excellent tilth at one plowing and one harrowing, it was necessary to go over the land twice with loaded harrow, twice with disc harrow, and twice with heavy roller before it was brought into condition of tilth even approximating what it might have had had it been plowed seven days earlier.

It is encouraging to the farmer to know that in putting into practice methods to check erosion, to deepen the soil, to improve the textural and physical condition of his soil, to promote bacterial life, to increase soil fertility, to liberate plant food, that he is also performing those operations that tend to increased moisture capacity, and that oftentimes he is accomplishing more than he knows.

THE RELATION OF COMMERCIAL FERTILIZERS TO SOIL IMPROVEMENT.

BY E. L. WORTHEN.

The fertilizer bill for North Carolina in 1910 was approximately \$12,500,000. This does not include cotton seed, cotton-seed meal, except where used in mixed fertilizers, nor farm manures. This year the cost of all fertilizers used in the State will probably reach \$14,000,000. The total fertilizer expenditure for the five-year period from 1901 to 1905, inclusive, was \$38,000,000, and for the following five-year period, which includes last year, nearly \$52,000,000.

This increasing expenditure for fertilizers has generally been accompanied by increased crop yields. In the case of cotton and tobacco, however, the two field crops which receive the heaviest fertilization, this is not true. Statistics show that the average cotton yields for these two five-year periods are virtually the same, while the average yield of tobacco has decreased somewhat.

When we consider that these crops have supposedly received better attention during the last period, we are hardly justified in drawing the conclusion that fertilizers are increasing our crop yields, and certainly not that they are rebuilding our soils. This does not mean that fertilizers have been used without profit nor that the yields have been less than without them. They have generally given handsome returns on both of these crops, and in the case of most of the soils have done more than any other one factor in maintaining the yields.

Nevertheless, such a great expenditure by the farmers of a single State should give some *permanent* returns. It should not be a constant drain on the farmers' profit. They can well afford to meet heavy fertilizer bills in times of high prices, but when the price of farm produce is down the margin of profit cannot cover a large fertilizer bill. The results obtained from the use of these rapidly increasing amounts of fertilizer certainly do not indicate that the expenditure has been made most wisely.

It is to the more economical use of fertilizers, and especially to the selection for permanency, that every landowner of the State should turn his attention. In the past, and even yet, the crop is commonly taken as the basis of fertilization. The commercial fertilizer industry has been built up almost entirely on this ground. Various materials have been mixed in varying amounts to furnish the requirements of the different crops. Hundreds of brands are on the market to-day, some recommended for cotton, some for corn, and others for tobacco, wheat, potatoes, etc. Some mixtures are claimed to be adapted to an individual crop, while others are recommended for several different ones. The soil has not been taken into consideration; the character, composition, and quality of the crop being the determining factors. In consequence of this, the farmer has naturally been led to overestimate the crop in purchasing his fertilizer. He generally selects one of the various brands recommended for the crop he is to plant, and unfortunately the price rather than the composition is too frequently the determining factor. The deficiencies of his individual soil, and the effect of fertilizer except on the immediate crop to which it is applied, are not considered.

At the same time the farmer is being advised to adopt other methods for improving his soil. He is urged to cultivate more thoroughly; to prevent erosion; to tile poorly drained lands; to turn under catch crops, especially legumes; and to produce and to return to the land as much farm manure as possible. These are all essential, but can bring about the greatest results only when employed in conjunction with a system of cultivation which is planned to supply the deficiencies of the soil. In other words, with the adoption of these other methods of better farming, conducive to the permanent upbuilding of the farm, selection of fertilizer for its permanent effect must be considered.

In the investigations of soil of North Carolina one of the important factors which we are considering is the relation of the different fertilizer constituents to the various soil types. The deficiencies of the individual soils have never received any direct study until very recent years. The results already obtained show beyond a possibility of a doubt that for the permanent increase of our crop yields the soil should be considered as the basis for determining the fertilizer application.

There are a great many distinct soils in North Carolina. Already nearly a hundred separate types have been found. The chemical composition in some types shows as large amounts of plant food as are contained in the black prairie soils of the Western States; while others have not enough total plant food in the surface soil for the production of a dozen maximum corn crops. The Porter's black loam, for instance, found in the mountains of the State, contains on an average 5,000 pounds of nitrogen, 3,000 pounds of phosphoric acid, and 30,000 pounds of potash in the surface 7 inches of an acre; while the Norfolk sand contains in the same strata 400, 500, and 2,000 pounds respectively. The former soil is well supplied with three of the important plant-food elements, while the latter is deficient in every one. Other types may be well supplied with one element, but very deficient in the other two. Such is the case with many of our agricultural soils of the piedmont and mountain sections. The red clay and clay loams of granitic formation found in the piedmont are generally well supplied with potash, but deficient in both nitrogen and phosphoric acid. The black soils of the coast region, on the other hand, are well supplied with nitrogen, frequently deficient in phosphoric acid, and in the southeastern part of the State also poorly supplied with potash.

In the following table are given the results of plat experiments on an important soil type in each of the mountain, piedmont, and coastal plain sections of the State:

FERTILIZER TREAT- MENT.	BLANTYRE FIELD. Porter's Clay, Chas. Baldwin's Farm.				GASTONIA FIELD. Cecil Sandy Loam. C. M. Faire's Farm.				GOLDSBORO FIELD. Norfolk Sandy Loam. J. R. Hooks' Farm.			
	Corn, 1910— Bushels per Acre.	Increase due to Fertilizer.	Wheat, 1911— Bushels per Acre.	Increase due to Fertilizer.	Corn, 1910— Bushels per Acre.	Increase due to Fertilizer.	Wheat, 1911— Bushels per Acre.	Increase due to Fertilizer.	Corn, 1910— Bushels per Acre.	Increase due to Fertilizer.	Oats, 1911— Bushels per Acre.	Increase due to Fertilizer.
No fertilizer.....	23.5		0		29.0		10.5		4.8		30.8	
Lime.....	28.4	4.9	0	0	30.9	1.9	10.7	.2	6.3	1.5	.9	12.1
Nitrogen.....	26.7	3.2	0	0	41.7	12.7	12.0	1.5	27.4	22.6	44.7	13.9
Phosphoric acid.....	39.0	15.5	6.2	6.2	35.1	6.1	16.0	5.5	4.4	— 4	31.3	.5
Potash.....	19.7	—3.8	0	0	31.1	2.1	9.3	—1.2	5.0	.2	44.7	13.9
Nitrogen, phos. acid....	55.0	31.5	4.3	4.3	53.4	24.4	29.3	18.8	24.8	20.0	44.9	14.1
Nitrogen, potash.....	28.7	5.2	0	0	44.6	15.6	15.7	5.2	33.8	29.0	65.5	34.7
Phosphoric acid, potash	40.1	16.6	7.2	7.2	35.4	6.4	12.3	1.8	5.1	.3	42.6	11.8
Nitrogen, phosphoric acid, potash.....	52.7	29.2	10.2	10.2	48.5	19.5	28.7	18.2	30.7	25.9	63.6	32.8
Lime, nitrogen, phos- phoric acid, potash..	59.8	36.3	23.2	23.2	46.9	17.9	29.0	18.5	36.9	32.1	77.3	46.5

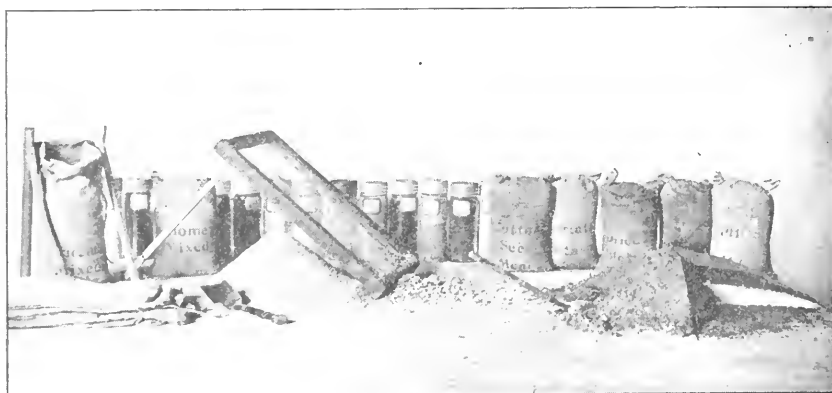
The same fertilizing materials were used on each of these three soils. The rate of application is based on the amounts of the various constituents removed by a maximum yield of the crop to be grown. Cowpeas were sown broadcast in the corn on all fields in 1910 and turned under in the fall before the small grain was seeded. Consequently the treatment for the small grain in each case is the same as for the corn, plus nitrogen secured from the atmosphere

through legumes. In the case of the Porter's clay, phosphoric acid is distinctly the controlling element of plant food. Phosphoric acid alone gave an increase of over 15 bushels per acre; in addition to nitrogen it gave 28.3 bushels, to potash 20.4 bushels, and to both nitrogen and potash 24.0 bushels. In the case of the wheat the crop was a total failure except in those plats which received phosphoric acid.

The results on the Gastonia field, which is on typical Cecil sandy loam, indicate that both nitrogen and phosphoric acid are essential, and that no very great permanent increase can be expected until they are both supplied.

The results on the Goldsboro field, on the other hand, show distinctly that for the Norfolk sandy loam nitrogen is the controlling element in crop production, and that potash stands second. The chemical analysis of this soil is shown to be low in phosphoric acid as well as nitrogen and potash, but phosphoric acid in the form of acid phosphate does not seem to be especially beneficial. Other carriers of phosphoric acid are being experimented with to find their effect on this soil.

Such results as these show beyond a doubt the great importance of considering the soil in selecting fertilizer. Certainly the farmer on Porter's clay will not find the same fertilizer mixture equally profitable for corn or any other crop as the one on Norfolk sandy loam. Both the Porter's clay and the Cecil sandy loam are well supplied with potash, and if intelligently handled should supply the crops with abundance of potash for years. Norfolk sandy loam, on the contrary, is deficient in potash, and this deficiency should be liberally supplied. Until we know something definite about the deficiencies of our soils, fertilizers cannot be selected most economically for permanent improvement.



HOME MIXING OF FERTILIZERS.

BY T. FRANK PARKER.

The importance of the home mixing of fertilizers cannot be emphasized too much, because it demonstrates to the farmer the importance of a knowledge of the different fertilizing carriers which contain the plant food; also, when studying these, he realizes the need of knowing more about plant nutrition and assimilation.

In fact, from observation and experience we may safely say that when we begin to mix our fertilizers at home we have taken the initial step to the most improved methods of farming. No sooner do we buy the three usual

ingredients for making up the complete fertilizer, namely, acid phosphate, cotton-seed meal, and kainit, then we wonder if we cannot use other ingredients that will supply the same plant foods cheaper.

It is a well-known fact that there are ten elements of plant food that are absolutely necessary for the plant to produce its proper functions. The plant usually finds all of these surrounding it, but there are from one to four of these that may be present in an available form, but is deficient in sufficient quantity to supply all the crop needs. These are phosphoric acid, nitrogen, potash, and perhaps sometimes calcium. The three that we usually consider are the first named, while the last is usually supplied in the form of lime.

Each of these plant foods has an important function. Phosphoric acid has the tendency to hasten maturity and stimulate fruiting. Nitrogen produces heavy stalk and foliage and the green color. Potash has an inclination to delay maturity, to hold the green color later and to make the fruit heavier.

On some soils one or more of these elements seem to have no beneficial effect; on others they even appear to be injurious. Again, we have some soils where two elements when applied separately seem to have no effect, while when combined they are beneficial. For instance, in some of our experiments we found, where we had a series of rows with acid phosphate and another with potash, having a blank row between, that the plats of acid phosphate and potash did not produce as much as similar plats where no fertilizer was applied, and yet the single blank row between the plats had a heavy yield. This was doubtless due to the fact that the roots fed from the two fertilizers which were applied in the adjacent rows.

This causes us to wonder why more of us had not known this all these years. It also causes us to realize that different types of soils must in many cases be fertilized differently.

This brings the subject to the point where the importance of home mixing can best be emphasized. From the above may be gathered the reasoning that soils may or may not need complete fertilization. If this be true, and that we may have a soil that does not need complete fertilization, why should we use an expensive ingredient for no benefit? Suppose, for instance, that indications pointed to phosphoric acid doing no good. When we consider that all 8 per cent phosphoric acid goods, such as 8-2-2, 8-3-3, and 8-4-4, are half acid phosphate, then can one doubt the wisdom of leaving it out and saving considerable unnecessary expense?

The second problem we considered was relative to using different materials for supplying the same plant food. Here is a list of some materials which may be used as fertilizer ingredients:

<i>Phosphoric Acid.</i>	<i>Nitrogen.</i>	<i>Potash.</i>
Acid phosphate, 16%.	Cotton-seed meal, 7½%.	Kainit, 12½%.
Basic slag, 19%.	Blood, 10-14%.	Muriate of potash, 50%.
Ground bone.	Nitrate soda, 15½%.	Sulphate of potash, 50%.
Ground phosphate rock.	Am. sulphate, 20%.	
	Tankage, 6-9%.	
	Fish scrap, 8%.	

From this list one may see that instead of being limited to one carrier for each plant food, there are several which may be used. Here again an explanation may be timely. It is a fact that certain kinds of fertilizing ingredients are usually best suited to certain crops, each having a slightly different effect on the crop, although at the same time it may be supplying the same element of plant food. In fact, the fertilization of the soil is a deep problem, but it is time we farmers should do away with the idea that we cannot dig into difficult subjects, especially when those problems have the relation to our occupation that commercial fertilizers have. It takes time, study, and application to master any problem. This emphasizes the point that we must do investigation for ourselves. Of course, this is going to require a little time and study, as well as expense, but compared with the valuable information and relief of mind, through overcoming unknown problems, what are a few measly dollars? And, again, consider what returns the application of such information

will mean. It has been but a few days before the writing of this that a farmer said to me: "I expect to save \$200 on my fertilizer bill next year by the better application of fertilizers. The experiment which I have carried on cost me no extra money and it has been the most important subject of interest in the neighborhood."

With an understanding of what has been said, we can the better comprehend the home mixing of fertilizers and why it is better for the farmer to mix his fertilizers on the farm.

By referring to the accompanying chart you will notice that we have for an example the 8-2-2 fertilizer—not because it is best, but because it is used more than any other. We, of course, advise higher grades than this. The charts are largely self-explanatory.

HOME-MIXING FERTILIZER.

(CHART NO. 1.)

<i>Phosphate.</i>	<i>Ammonia.</i>	<i>Potash.</i>	
8	2	2	lbs. plant food in 100 lbs. fertilizer.
		20	
—	—	—	
160	40	40	lbs. in a ton of fertilizer.

<i>Plant Food Needed.</i>	<i>Materials Used.</i>
160 lbs. Phosphoric Acid requires	1,000 lbs. 16% Acid Phosphate.
40 lbs. Ammonia... (20 requires	105 lbs. Nitrate of Soda.
40 lbs. Potash (20 requires	250 lbs. Cotton-seed Meal.
	requires 80 lbs. Muriate of Potash.
240 lbs. Total.	1,435 lbs. Total.

(CHART NO. 2.)

<i>Materials.</i>	<i>Cost.</i>	<i>Element Furnished.</i>	
16 % Acid Phosphate	\$15.00 a ton.	Phosphorus.	
8 % Cotton-seed Meal	32.00 a ton.	Nitrogen.	
19 % Nitrate of Soda	50.00 a ton.	Nitrogen.	
50 % Muriate of Potash	45.00 a ton.	Potassium.	
12½% Kainit	12.50 a ton.	Potassium.	
<hr/>			
<i>8-2-2.</i>	<i>Cost.</i>	<i>8-4-4.</i>	<i>Cost.</i>
1,000 lbs. Acid Phosphate	\$ 7.50	1,000 lbs. Acid Phosphate	\$ 7.50
250 lbs. Cotton-seed Meal	4.00	500 lbs. Cotton-seed Meal.....	8.00
105 lbs. Soda	2.55	210 lbs. Soda	5.25
80 lbs. Potash	1.80	160 lbs. Potash	3.60
<hr/>		<hr/>	
1,435 lbs. Fertilizer	\$15.85	1,870 lbs. Fertilizer	\$24.35
565 lbs. Filler.		130 lbs. Filler.	
<hr/>		<hr/>	
2,000 lbs.		2,000 lbs.	
Commercial 8-2-2	\$19.50	Commercial 8-4-4	\$30.00
Home Mixed 8-2-2	15.85	Home Mixed 8-4-4	24.35
<hr/>		<hr/>	
Saved	\$ 3.65	Saved	\$ 5.65

It will be noticed that there are 8+2+2 or 12 pounds of plant food in 100 pounds of this fertilizer. Of course, there are 240 pounds or twenty times as much in a ton. This amount is divided among the three plant foods that are usually deficient in the soil, viz., phosphoric acid, nitrogen or ammonia, and potash. To supply these amounts we use the ingredients indicated at the top of chart No. 2. This shows the percentage of plant food, the name of the ingredient, the cost and element of plant food furnished.

As indicated on chart No. 1, we need 160 pounds of phosphoric acid, which we will suppose to be derived from 16 per cent acid phosphate. Sixteen per cent acid phosphate contains 16 pounds phosphoric acid to each 100 pounds of acid phosphate, so, to get 160 pounds phosphoric acid, we will have to use 1,000 pounds of the acid phosphate. A similar calculation will hold good with the ammonia and potash.

The total weight of the ingredients used will be 1,435 pounds. This means that only this amount is necessary to make an S-2-2 fertilizer.

Chart No. 2 shows the comparison of the S-2-2 and the S-4-4 fertilizer mixtures as to the amount of materials used and the cost. The S-2-2 commercial fertilizer, then, contains 565 pounds of filler, which has no value and is necessarily an additional expense and burden. The S-4-4 has only 130 pounds of filler. This would indicate that it would require a higher grade fertilizer than an S-4-4 to make the full ton contain no filler.

The S-2-2 contains 240 pounds of plant food.

The S-4-4 contains 320 pounds of plant food.

The cost will vary according to the prices that will have to be paid by the farmer, but those are prices quoted to me at Raleigh in July.

Any farmer may figure out what his fertilizer will cost by the same method. Ask the fertilizer dealer for prices and compare figures. See if there will not be enough saved to cause your careful consideration.

After undertaking this, I would suggest that the first step in the proper handling of fertilizers is to secure the best prices on the different ingredients from several wholesale dealers or factories. Acid phosphate should not be purchased from the factory during the rush season, for if this is done it often is not dry and as a result weighs heavy and eats the sacks very quickly. But when purchased after or before the rush season it will likely be lighter in color and dry.

In this condition it contains relatively more plant food. It might be advisable to build a bin for the acid phosphate under the shed where it may be easily drawn out when needed. As soon as it is hauled have it dumped into this bin and have the sacks washed immediately. In this way the sacks may be kept in good condition for use later. In fact, if all the fertilizer sacks are washed, as soon as emptied, dried and put away where the rats will not cut them, it will mean a considerable saving instead of buying new ones, and will save the women folks considerable trouble in repair work when the threshing season comes.

Do not store any fertilizer materials on the ground, no matter how dry it may seem, but on a plank floor.

Some use wagon bodies for mixing the materials in, but we feel that a farmer ought to have more room for mixing the pile back and forth. It is all right to screen this mixture into a wagon body, though, for from such a receptacle it may easily be sacked.

By practicing home mixture of fertilizers we may mix any amount of any grade at a time when there is a slackness in the field work. Some do this during rainy days. By actual experience it costs, including labor, about 25 cents per ton to mix fertilizer on the farm. Compare this with the saving to be had and I am sure the results will be in favor of home mixing.

STABLE MANURES.

BY G. M. GARREN.

Frequently we hear some people, especially fertilizer agents wanting to sell their goods, belittling the values of stable manures as a soil improver and, consequently, as a crop producer. They will cite you to the chemical analysis of stable manure.

Here is one of the tables frequently quoted:

COMPOSITION OF FRESH STABLE MANURE, POUNDS PER TON.

Kinds of Manure.	Dry Matter.	Nitrogen.	Phosphorus.	Potassium.
Horse.....	659	11.5	2.4	9 6
Cow.....	294	7.6	1.4	6.

They will point out that the plant-food elements are exceedingly low. The nitrogen in a whole ton of horse manure is only 11½ pounds—11½ pounds in 2,000. The phosphorus is less than 2½ pounds in 2,000. The potassium just a little more than 9½. And, as you see, the figures are still lower in the cow manure.

There is no denying these figures; they are correct. Yet every farmer knows that stable manure has a value far beyond that indicated by this analysis.

Mr. A. Cannon of Horse Shoe, Henderson County, gives me this bit of his own experience in the use of stable manures. I select this for illustration out of many others because of the accuracy with which it was conducted. Mr. Cannon planted a very poor piece of land in corn; prepared the land and cultivated the corn according to the most approved and up-to-date methods. In the fall, by actual measurement, he harvested a crop of 12½ bushels per acre. He was so disgusted with the results he left the land fallow the next summer. That winter he fattened a car-load of steers for the market and fed a great deal of cotton-seed meal. The following spring he hauled 20 two-horse loads of this manure per acre on the field in question. After the second plowing a storm came and blew down his corn, so he could give it no further cultivation. In the fall he went into the field with a North Carolina sealed tub, without any guessing or estimating, but, by actual measurement, harvested 64 bushels per acre.

What is the explanation? Prof. J. G. Lipman of the New Jersey Experiment Station, in trying to find how much nitrogen was gathered from the air by the ordinary bacteria of the soil, made this experiment: He grew barley in pot cultures and in four different experiments. In the first pot he grew nothing, and at the end of the season analyzed for nitrogen. There was an increase in the nitrogen of 1.02 grams. In the second he grew barley, but added nothing to the soil. There was a slight increase, but not enough to measure. In the third he added one gram of nitrogen in the form of nitrate of soda. There was an increase of 3.75 grams. Now, here is what we want to remember: In the fourth he added one gram of nitrogen in the form of stable manure. After harvesting his barley and again analyzing the soil, he found an increase of 10.48 grams of nitrogen. The single gram added increased more than ten-fold. How did that happen? The bacteria feeding upon the vegetable matter in the manure gathered this extra amount from the air. I know no reason why the same rule should not hold and the same results be obtained in applying stable manure to the ordinary soil of the field. If so, then the little 11½ pounds of nitrogen in a ton of horse manure becomes 115. For fear these figures are a little too large and the rule does not always hold good, let us cut them about half in two, and say he gets 60 pounds increase. That is 25 pounds more than one gets in a whole ton of the 8-2-2 grade of commercial fertilizer. The manure will cost something like \$2, the fertilizer \$20.

Now, if we are agreed that stable manure does have great value, does it not behoove us to save with scrupulous care every pound made on the farm? What is our customary method of saving our stable manures? Is it throwing it out beside the barn to fire-fang and leach all winter long? Am sorry this is far too often the custom of many. How much do we actually lose by such methods? The Maryland Experiment Station piled 80 tons out in the field in true farmer style. At the end of one year they gathered it up and weighed it and found they had 27 tons—a loss in gross weight of 53 tons.

Professor Shutt, chemist for the Experiment Station of Canada, exposed two tons of manure four months from April 29th to August 29th. At the beginning this manure contained 1,938 pounds of vegetable matter and 48.1 pounds of the precious plant-food element, nitrogen. At the end the vegetable matter had been reduced to 655 pounds; the nitrogen to 27.7 pounds. A loss of 1,283 pounds of humus and 20.4 pounds of nitrogen—two things absolutely essential to fertile soils and large crops.

One more illustration: This is from the Cornell Experiment Station and shows the loss by a five months exposure for horse and cow manure.

HORSE MANURE.

	April 25th. Pounds.	Sept. 25th. Pounds.	Loss per cent.
Gross weight.....	4,000	1,730	57
Nitrogen.....	19 60	7 79	60
Phosphoric acid.....	14 80	7 79	47
Potash.....	36	8 65	76

COW MANURE.

	April 25th. Pounds.	Sept. 25th. Pounds.	Loss per cent.
Gross weight.....	10,000	5,125	49
Nitrogen.....	47	28	41
Phosphoric acid.....	32	26	19
Potash.....	48	44	8

Without attempting to remember all these figures, one readily sees what is indicated in the per cent column. The horse manure lost in a five months exposure, generally speaking, from one-half to three-fourths of its original amounts; the cow manure from one-fourth to one-half. From all these illustrations one can safely get the general working proposition, that stable manure will lose more than one-half of its value in a four months exposure.

How is the loss to be overcome? By the adoption of better methods of saving stable manure. Dig a pit sufficiently large to meet each one's requirements. Line it with cement plaster. Cover it to protect it from the rains. Into this pit dump all the manures as fast as they accumulate and then keep it sufficiently moist to prevent fermentation. In winter when the rate of evaporation is low the liquid manure will be sufficient for this. Just here let me say it is all-important to save the liquid manure, for, in general terms, three-fourths of the nitrogen and four-fifths of the potash are contained in the urine of the animals.

The only trouble with this method is, only up-to-date farmers will adopt it, thus leaving the rest to waste their manures in the same old way. Some other way must be found. The next best is to allow the manure to accumulate in the stalls till it can be conveyed to the fields. The tramping of the animals and the liquid manure will keep the whole mass compact and prevent fermentation. This works all right with horses; but with cattle, on account of the much larger accumulation, it does not work so well if the time before removing is considerable, as it is likely to be in the winter-time. This can be overcome by each man building a large covered shed for his cattle. This will give his cattle room to exercise without exposure to inclement weather and will afford the best facilities for saving his manure. I have seen this tried, and so far as I could observe the manure was saved perfectly.

If neither of these plans are practicable, haul the manure out as fast as it accumulates to the fields where it is to be used. Scatter as soon as hauled. Do not leave in piles. Always spread, if possible, on some winter cover crop that is to be turned under in the spring for corn or cotton, because stable or barnyard manure should be applied to such crops as corn or cotton, since they are gross feeders and grow practically through the whole growing season, thereby utilizing the plant-food elements as fast as they are liberated by decay. The small grain crops are not such gross feeders, mature earlier in the season, and are shallow rooted. The residual effect of stable manures gives much better results with these crops.

Frequent light applications are much better than heavy applications at longer intervals of time. The criticism I have of Mr. Cannon's efforts, cited above, is that in all probability he would have obtained equally as good results with half the amount. An application of one ton per acre every year is better than an application of four tons every four years. With a heavy application more plant-food elements will probably be liberated than the growing crops can utilize and loss from leaching would result, especially on sandy soils.

Apply manures after the land has been turned. Bacterial life is much more active four or five inches below the surface than it is ten inches below. This method does not call for any extra work, for the ground has to be pulverized.

This discussion implies that one has used quantities of coarse materials for bedding. The kind of bedding is very important from the standpoint of manure saving. The protection and comfort of the animal is the first consideration, saving manure the second. The combination of perfection in both is the ideal arrangement. For manure saving the bedding must be a good absorbent, for the liquid manure is the more valuable part. In order of their absorbent qualities we name peat, sawdust, fine cut straw, coarse uncut straw. You see peat stands first and is good bedding. It is almost ideal. Any dry earth with plenty of humus in it is good, but it requires great amounts of it. Sawdust is a first-class bedding and a good absorbent, but is itself a poor manure. It does not decay readily, and if from pine lumber may introduce substances in hurtful amounts into the soil. This last, however, is a remote possibility, and sawdust in the absence of something better can and should be utilized. Straw, as may be seen, is a good all-round bedding. Oak leaves are good—a poor absorbent, but good bedding, and have a small manurial value of their own. Pine needles is fairly good. It is much better to utilize all these things on the farm for stock bedding than to burn them. A farmer has no use for fire except to cook his food and keep him warm in the winter-time.

All stalls should have cement floors, so that every drop of the liquid and every ounce of the solid manure may be saved. It is of too great a value to be lost.

Yet, after all the good things—and they are many—have been said in favor of stable manure, the amount will always be inadequate. I will give \$25, and pay it when I get rich, to the man who feeds only what he raises on his own farm to live stock, returning the manure to the land, and thereby build up or keep up the fertility of his farm without the growing of legumes. To the dairyman or other live-stock man, who feeds the products of other farms, this does not apply. But the majority of farmers are always going to be grain farmers. Here in the South the majority of our farmers are always going to find cotton growing more profitable than live-stock farming. All these will have to resort to something else than stable manure to maintain the fertility of their lands. Commercial fertilizers as permanent soil improvers have already proven a failure—good temporary crop producers, but poor permanent soil improvers. Of the three principal means of soil improvement, the growing and turning under of legumes, called green manuring, stable manures, and commercial fertilizers, the first is fundamental and of universal application. Here is the beginning of soil salvation. Three things are absolutely essential to the building up and maintaining of southern soils—humus, nitrogen, and winter cover crops to prevent leaching. Here we can kill three birds with one stone. Sow a legume winter cover crop, turn it under in the spring for the summer crop. Then you have humus, absolutely essential to soil improvement; the valuable nitrogen, absolutely essential to large crop production, gathered from the air at small cost; and a winter cover crop, another absolute essential in this southern climate to prevent waste by soil leaching.

FERTILIZERS FOR SPECIAL CROPS.

By T. E. BROWNE.

The farmers of North Carolina will have a fertilizer account for 1911 amounting to about \$15,000,000. Can we as a class afford to expend this amount of money annually without looking into the why and wherefore of the matter? It is not the purpose of this paper to discourage the use of commercial fertilizers, or to make the impression that we are using too much. The fact is we are not using enough. It is my intention to arouse in the minds of my fellow farmers a desire to study this question from an intelligent, scientific standpoint, and only expend their money for the elements of plant food essential to the needs of the particular crop and soil for which they are to use the fertilizer.

Our forefathers knew nothing about commercial fertilizers. The virgin soil contained all the elements of plant food, to a greater or less degree, that were necessary to plant growth. However, by the constant cropping of these fields the elements that were most necessary to plant growth were converted into the farm product and sold from the land. The inevitable result followed. The land became less productive, and poorer crops were harvested each year. The farmers soon found that something was lacking. They used ammoniated manures, and wood ashes, rich in potash, and saw marked improvement. From this beginning the fertilizer business has grown to the enormity indicated by the above figures.

Then we use fertilizers to restore to the soil the natural elements that have been removed by man. The high price of farm lands, farm labor, mules and machinery have made it necessary to get larger yields from our land, and this can be done by the economic use of fertilizers. Admitting, then, that the chief cause of the use of fertilizers is to add plant food, we should know what elements we need to buy and the source from which they are derived. There are about ten elements of plant food essential to the growth and maturity of all plants. However, it seems that all these, except probably three, are present in most soils in sufficient quantities to meet all demands. The three elements that are taken up most largely by the plants are nitrogen, phosphoric acid, and potash. Therefore we are concerned only about the amount of these elements contained in a ton of fertilizer.

I might mention, in passing, the chief sources from which these elements are derived. Our nitrate, or readily available nitrogen, is derived from nitrate of soda and sulphate of ammonia. The chief sources of organic nitrogen are: cotton-seed meal, dried blood, fish scrap, and tankage. All of these are very good sources from which to obtain nitrogen, the best form in which to buy it depending upon the growing period of the crop for which it is to be used. Potash is derived from kainit, muriate of potash, and sulphate of potash. Phosphoric acid is obtained from acid phosphate (which is phosphate rock pulverized and treated with sulphuric acid), Thomas phosphate and the natural or untreated rock. All this is sold on a basis of the per cent of water-soluble acid.

The form of the mineral elements has little to do with their agricultural value. The high-grade materials being cheaper, however, because we handle less bulk in order to get a given amount of plant food. In the case of the gaseous element, nitrogen, it is quite different. This is the most expensive element we use, and at the same time is the most easily lost. As has been suggested, if we are fertilizing short-season crops, such as the truck crops, the nitrate nitrogen is preferable, as the plant food begins work almost immediately. If we are fertilizing such crops as cotton and corn we should endeavor to derive a part of the nitrogen from an organic source. As this material has to decay and decompose before giving off the gas, the available nitrogen is gradually supplied the plant through the growing period, provided there is sufficient moisture in the soil to carry the plant food in solution.

It is furthermore necessary to know the form of the material from which the nitrogen is derived, because the unscrupulous manufacturer of a manipu-

lated guano can easily satisfy the demands of his formula from such nitrogenous materials as old leather wastes and hair wastes which decompose and give off the nitrogen in from two to ten years. There has been a custom among the farmers of the South to use the cheapest ready-mixed fertilizer on the market, regardless of content or quality of plant food contained therein.

In order to judiciously deal with the subject of commercial fertilizers for special crops it is necessary for the farmer to study the mechanical and physical condition of the soil. It is a well-known fact that a given fertilizer will not produce the same results on a shallow, compact soil, composed entirely of sand and clay, underlaid with a hard-pan, as it will produce on a mellow, well pulverized, deep soil which has been well drained. We must take into consideration the water-holding capacity of the soil. The only form in which the plant food can be of service to the plant is in solution, and if the water is not in the soil to carry the plant food in solution, the crop will suffer for lack of nourishment, it matters not how much fertilizer has been used.

It is also true that a poorly drained soil prevents the proper action of the fertilizer; because if there is too much water the solution will be too much adulterated and the plant will suffer.

It is an established fact that different soils contain the elements of plant food in varying quantities. In fact, we frequently find soils in the same field that vary widely in chemical composition. Almost all soil contains some plant food. It is therefore necessary for us to endeavor to find out those elements that are deficient in a given field or plot of land and increase the amount of those elements in the fertilizer used, and not add any more of that element that is oftentimes already present in a greater quantity than can be used by the plant. The best way to get the above information is by experiment on our own land. We should test the different elements on a small scale and thus learn which gives the best results. We will then know which element is most needed, and increase this in the mixing of the fertilizer and decrease the amount of those that seem to give no results. We should also study the results from tests made by the Experiment Station and Test Farms on soil most similar to that to be fertilized. We should never depend upon chemical analysis for this information. No man can intelligently and economically use fertilizers till he has learned the needs of his soil.

Then, again, we should know something about the demands of the different farm crops. The three important elements—nitrogen, phosphoric acid, and potash—each has a special function in the growth of the plant. It is true that these elements may sometimes fail to produce the anticipated results because of the bad mechanical condition, or the lack of the required balanced ration. From a general standpoint, it is agreed that nitrogen is the leaf and stem producing element. In other words, it stimulates plant growth. Phosphoric acid is the seed and fruit producing element. Potash produces the woody fiber, the tuber in the case of the tuber crops. It gives the peach its ruddy hue and is necessary to the best maturity of all fruit.

It is also true that the different farm crops demand these elements in a widely varying proportion. No two crops draw on the soil for precisely the same amounts of these elements. We should learn the function of the various elements of plant food, the demands of the different farm crops in which we are interested, and, by using this knowledge, stop buying and adding to our soils those elements that actually in many cases have an adverse influence upon the growth of the crop. For instance, we grow cotton for the lint—the fruit, as we call it. We use a fertilizer too rich in nitrogen; the plant grows too rapidly, the limbs are too long, the squares are thinly set along the branches on account of the rapid growth, and the fruit is sacrificed for leaf and stem or stalk. Furthermore, the crop is apt to grow too late and the cotton not to open. The same thing may be true with reference to other plants. A farmer may use a fertilizer for wheat rich in nitrogen and phosphoric acid; the plants grow tall and make good heads, but in the absence of potash the stalks are weak and slender, have not enough of the woody fiber, and the wheat falls down so it can't be harvested. We should feed to the crops those elements that produce whatever results we are aiming for. If we are growing a grass crop for hay we should use freely that element (nitrogen)

which makes leaf and stem. If we are after seed, we should use phosphoric acid, the seed-producing element. If we want the tubers, or need the woody fiber in a crop, we should use an abundance of potash to bring about this result. All crops need all the elements in some proportion, but the farmer can regulate the proportion.

The purpose of this paper is primarily to impress upon my hearers the fact that we can never control the conditions I have mentioned above as long as we depend upon the standard ready-mixed fertilizer, such as 8-2-2 and 8-3-3. The only way to use fertilizers, anyway, is to buy the raw materials of the best grade and mix them at home. We can then suit a formula to the varying demands of the crops we are growing. We can furthermore get the plant food at a much lower price per pound; we know what we are getting when we mix it at home, and we do away with the hauling, freighting, and distributing of that vast amount of sand, or make-weight, that is put into every ton of low-grade manipulated fertilizer. Furthermore, we can mix the materials at home for about one-fifth of what the other fellow charges for the same job.

One of the great needs of our State to-day is the elimination of low-grade manipulated fertilizers and more home mixing.

CULTIVATION OF THE CORN CROP.

BY E. S. MILLSAPS.

Cultivation is an act of tillage, and necessarily begins with the first furrow run in the field; yet, as this subject is divided, and another has discussed the preparation of the seedbed, I shall confine this paper to the methods adopted by the most successful farmers in the cultivation of the corn crop.

The importance of the corn crop demands that we use the best methods in its cultivation, so that we can get out of it the largest returns. Indeed, the farmer should use every means in his power to increase his yield of corn. The corn crop is of so much importance to the North Carolina farmer that it should demand his highest talent and energy. So long as the State imports corn in such large quantities there is need of increasing this important crop. It furnishes both bread and meat, and if a surplus is produced it is readily convertible into cash to supply the luxuries of life as well as the necessities.

The soil being prepared and the crop planted, the next question is how to cultivate the crop so as to enable the land to produce the largest and most profitable crop. While the lack of preparation of the land has had a great deal to do with the short yields of corn in our State, no doubt the methods of cultivation have had much to do with these yields. So long as we produce yields averaging around fourteen bushels we know something is wrong, either in the method of preparation or cultivation.

Cultivation is tillage, and tillage is said to be manure. Cultivation is practiced for two primary reasons. The first is for the purpose of conserving the soil moisture, and the second is to make plant food available.

Proper tillage for the conservation of moisture consists in maintaining a dust mulch on the surface of the soil to prevent the too rapid evaporation of water from the soil. After every rain the surface of the soil forms a crust which encourages rapid evaporation by reason of the fact that this crust helps to draw the soil moisture from below. If this crust be broken by cultivating the surface, the evaporation will be greatly arrested, and the moisture in the soil will remain for the use of the plants.

We also cultivate to make plant food available. The more frequent the cultivation the more plant food is the plant enabled to get from the soil. We are said to cultivate the land to kill weeds and grass. Cultivation to destroy weeds is really not the real reason, and is merely incidental. If a crop is

cultivated to conserve moisture and to make plant food available, there are really no weeds to kill, because these will be destroyed incidentally even before they are seen.

As soon as the corn is planted the cultivation should begin. A harrow or weeder should be run over the field to keep the surface in good condition and to conserve the moisture. If there should come a shower, the same operation should be repeated for the same purpose, and this should be continued until the crop becomes too large to use these implements. At this point, unless the soil is in the best mechanical condition, it is advisable to cultivate rather deeply in order to open up the soil for the circulation of air and sunshine into the soil, and at this time the root growth has not become so large as to cause damage to the crop by slight pruning. After the corn has attained a height of eight inches this should be discontinued.

The harrow and the weeder are economical tools to use in the first cultivation, because they cover so much surface and do the work in a thorough manner—that is, they stir the entire surface, breaking every inch of the soil crust and dislodging all weed seeds that may be germinating at the time. The next tool to use should be the riding or walking row cultivator, preferably the riding cultivator, because at each crossing of the field one row is finished. It is advisable for the farmer to consider the cost of cultivating his crop, and if he can do the work just as well by one crossing as he can by two crossings, he has saved one trip across the field; and in this day of scarce, high-priced labor, the saving of one trip counts immensely. It means the cultivation of his crop two times where he would cultivate only once with the one-horse implement, and this saving of time and expense enables him to reach his crops soon after the rains, before the sun and wind have crusted the surface and started the weeds and grass. Such rapid cultivations eliminate the use of the hoe, a very expensive tool to use on the farm. These cultivations should be continued until the corn is too large to use the riding cultivators. Of course, this should be done shallowly, so as to break as few roots as possible. When the corn is too large to use the row cultivator, the Iron Age or some other tool cultivating one middle at the time should be used. These small one-horse cultivators can be used more advantageously in large corn than the two-horse cultivators, and, besides, they have small, spiked teeth which merely scratch the surface, forming a mulch to conserve the moisture by preventing rapid evaporation. This should be continued until the corn begins to tassel and silk.

If cowpeas are to be sown in the corn, this should be done before it is too late for the peas to get considerable growth, as it is useless to sow peas very late in corn. It is advisable to plant peas in corn, but the best way I have found to do this is to take the planter when the corn is half-leg to knee high, and plant a row of peas five to six inches from the corn row, using some fertilizer, and the cultivation can be continued just as if there were no peas. This method is advisable, because the cultivation can be continued much later and the peas have a longer period of growth.

The question of moisture in corn growing is the great unsolved problem. It requires from 1,400 to 1,800 tons of water to produce a good corn crop, and we rarely get this amount of water in the usual rainfall of the growing season from May to September. If a deep and well-prepared seedbed has been provided, and the cultivation has been good, we have reasonable certainty of a good crop; but if either is neglected the crop will be short. Clay soil bakes hard after a heavy rain, and if this should not be broken up immediately, the loss of moisture is very great. Indeed, the loss of moisture is so great and the soil becomes so packed and hard that it is hardly possible to bring the soil again into good condition. Therefore the value of cultivation can hardly be overestimated. The land between the rows should be left level so as to expose as little surface as possible.

With good preparation, and the method of cultivation herein outlined faithfully carried out, there is reasonable certainty that a large yield of corn may be expected.

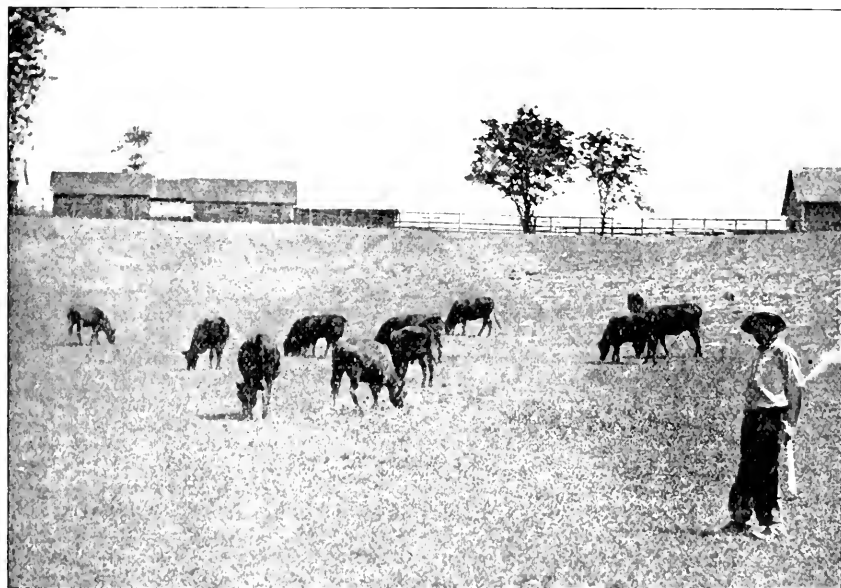


IREDELL COUNTY. SHOWING EFFECT OF 1911 DROUGHT AND PROPER METHOD OF CULTIVATING FOR SUCH CONDITIONS.

LIVE STOCK ON THE FARM.

BY A. L. FRENCH.

In the handling of beef cattle either of two methods may be used, or the two may be combined. First, cattle may be grown on the farm until twenty to twenty-four months of age, when they are disposed of—in good growing farm condition—to professional feeders. To make this line of work profitable, good pastures are the first thing needed—not bush lots inclosed by a fence, but good soil well set in native and wild nutritious grasses. I believe our greatest failure in North Carolina in connection with the live-stock business is our almost universal lack of good pastures. No method of feeding animals is so economical as grazing, and no treatment of our soils is as beneficial to them as the covering of them with grass and clovers; these grazed off by animals and the droppings and urine left on the land, all the plant food and vegetable matter being returned to the soil from which it came except the small amount that is retained by the animals in the building of tissue.



ABERDEEN ANGUS CATTLE.

After good pasture comes a liberal supply of winter food cheaply grown and harvested. Nearly all stock foods may be produced in large amounts by the use of machinery, and the greater part of the harvesting may be accomplished by the same means. This being the case, as large a profit should not be expected by the man who does not make use of these labor-saving tools, in the growing and harvesting of his stock-food crops, as may reasonably be expected by the man who does make economical use of them. These foods taken in the order of their importance are corn silage, legume hays, corn fodder, sorghum hays, and the different meadow hays.

Selecting the cows that are to raise the calves is an important matter, and I would lay especial stress on the fact that they must be cows that give a good quantity of milk and are also of compact build. The man on the small

farm will want half of his lot of cows to nurse all the calves dropped by the entire lot each spring. Two calves may be taught to nurse one cow by confining the cow in a stallion for a week or so while the course of instruction is under way; then the calves should have a first-class pasture near the stable with abundance of dark shed room—to help in the eliminating of the fly pest. The nurse cows will be turned into this lot night and morning, while the balance of the herd is being milked to supply the milk and butter for family use. If some shelled corn is supplied to the calves after they are three months of age more rapid and economical gains may be expected. The first winter of their lives should be spent amidst peace and plenty. The peace being secured by having a light, well bedded open shed to run in and being tended by a quiet, painstaking feeder. The "plenty" means abundance of well-ripened corn silage and legume hay. Cheap grass comes again in early April in the shape of fall-sown rye and crimson clover, and from these feeds the calves will go in May to the permanent pasture. The bull calves will have been castrated when about two or three months of age; the only "sign" to be looked after being that the knife is sharp and a bucket of disinfectant dip be at hand with which to wash the animals when the operation is completed. The steers may be sold in November when they are 18 to 20 months of age (at \$80 to \$50 pounds) or be carried through another winter on silage and legume hay and grazed another summer, when they should weigh around 1,200 pounds, and should sell, at present prices, at \$40 to \$50 each at 18 months or \$60 to \$65 at 30 months of age.

The price received will depend very largely on the sort of care the young things have received and the kind of "daddy" they had. The type of the sire used will generally have 30 per cent to 50 per cent to do with the price the feeders will bring on the markets. A scrub bull will generally get 2½ to 3-cent feeders, while the low, blocky, broad, square-headed, pure-bred beef bull will generally sire calves that will sell at \$4.50 to \$5.75 per hundred pounds.

If the breeding and feeding method are to be combined—a practice which I recommend in any section where level land enough is available on which to produce the rough feed and 75 per cent of the finishing grain fed—the steers should be started on grain along with their silage and legume hay the second fall, when they are 18 to 20 months old. Give what silage and hay they will consume at the start and with this start them out on a pound each per day of cotton-seed meal and gradually increase this amount until at the end of thirty days they are using 4 to 5 pounds per day. Three or four pounds of shelled corn (per head) should be fed, also bringing them up gradually to this amount, as with the meal. One hundred and twenty to 150 days feeding should make the steers prime beef ready for the market at 1,200 pounds in late February or early March. Let the steers have a well-bedded shed, open to the south, for a sleeping and resting place, with a small yard attached that is kept well littered. Have this yard so that surface water from the surrounding land cannot flow into it, and never let any water drain out of it. If abundance of corn fodder butts be used for litter the yard under these conditions will be kept in good condition.

The man who purchases feeders in the fall to fatten on home grown or purchased foods must be a good judge of cattle, must be a good feeder, must know when to buy and when to sell, must know how to handle cattle on the way to market to avoid excessive shrinkage. Then the business is always more or less of a gamble, as no man when buying feeders and feed in the fall can tell much about what the market will be in the spring when he is ready to sell. The safe way, as the writer sees it, is for each farmer to raise his own feeders, feed them to a finish at from 20 to 22 months of age, and reap the profit there is in both the raising and finishing, and also give to his farm the benefits that come from having a good acreage in pastures each year.

LIGHT HORSES, AND CARE AND MANAGEMENT OF LIVE STOCK.

BY DR. G. A. ROBERTS.

LIGHT HORSES.

No doubt the heavy or draft type of horse should be far more seriously considered to-day on many of our farms. Yet there is room also on many farms and elsewhere in the State for "The Light Horse."

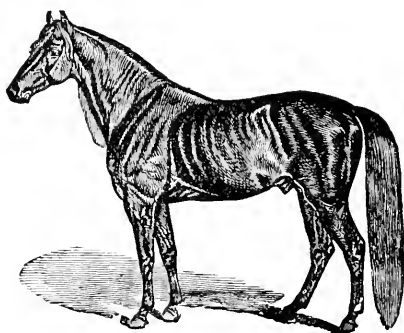
Both these classes of animals should be in greater numbers, and they should be bred and raised as far as possible within the bounds of our own State. There should be a good reason for not breeding all of our female animals, and to a pure-bred sire, in an attempt to grade up our animals.

The term "Light Horses" among the pure breeds refers to the carriage (coach) type, the roadster type, and the saddle type, each being rather definite in its conformation. Other than among the pure breeds, the so-called market classes are numerous and quite variable in conformation.

For a concrete example and as the opposite extreme of the draft type (other than pony), we will confine our remarks largely to the roadster type.

All horses, of course, should be sound and free from disagreeable habits and vices. If they are to be purchased they should preferably be mature, well broken and seasoned, but should not be too old. Many horses are serviceable up to the age of 20 years or more, yet the majority "have seen better days" before this age. Perhaps the average period of greatest usefulness is between the ages of 6 and 14.

The following are some of the desirable features or points of the light horse, the roadster in particular:



In such animals, while not necessarily possessing a racing speed, ability to get up and go at a good gait and keep at it is desired, if not demanded.

The weight should be about 1,000 pounds and in the neighborhood of 15½ hands (62 inches) in height.

Compared with the heavier animals, their legs appear longer and therefore a greater amount of "daylight" under the belly is permissible.

The head should be of medium size, clean cut, rather lean in appearance, neatly attached to the neck and making an angle of slightly more than 90 degrees (right angle) with the neck. The space between eyes (forehead) should be broad, nose fairly straight, sides of face slightly dished and free from meatiness. Eye should be full, bright, and clear; nostrils comparatively large and easily dilated; ears of medium size, standing more or less erect, showing alertness, approaching one another slightly at their tips.

The expression given by the eye and ear often indicate the disposition of the animal.

The neck should appear rather straight, long, and somewhat thin from side to side, yet well covered with firm muscle. It should blend well with the shoulders, though not as smoothly as in the draft or the carriage types.

The back should be moderately straight and short, strongly muscled, but the withers may appear rather thin and prominent compared with the heavier types; the loins wide and short, giving appearance of being "well coupled."

The croup (rump) should be somewhat sloping and rounded, with good length; the tail well set and hung in a pleasing manner, not too close in, not too far away, nor crooked.

The chest, while not appearing as broad and rounded as in the draft horse, should nevertheless be formed by well-sprung ribs (not flat sided), with considerable depth carried pretty well along the belly line (not cut too high up in the flank) giving plenty of room for organs of chest and abdomen.

The shoulder in the light horse should be quite long and sloping contrasted with the heavy horse, in order that the movement (action) may be elastic, quick, and clear.

The fore limbs should fall perpendicular from its body attachment to the ground. A plumb-line from point of shoulder should fall just in front of the toe, marking the middle of knee, cannon and foot.

The arm should appear short and straight; the forearm (between elbow and knee) relatively long, covered with well defined, firm muscles.

The knee should be broad, deep, and well supported, but clean.

The cannon (knee to fetlock) ought to appear comparatively short and quite broad from before back, not badly "tied in" back of knee. All structures should feel firm, hard, and clean; free from meatiness or coarseness.

The pastern should likewise be free from fleshiness or coarseness, but strong and sloping, forming angle of about 45 degrees with the ground; free from wind galls and bony enlargements.

The feet should be sufficiently large, but not appear "flat-footed"; wide at the heels and show a well-developed frog; the hoof wall should appear shiny (waxy), smooth and dense; free from cracks, ridges, and scales. The direction of the toe ought to be nearly if not in line with that of the pastern.

The hind limb should neither be too straight nor too crooked. A plumb from center of hip joint should divide the gaskin (lower thigh) and foot in their middles; likewise a line from point of buttocks should equally divide the leg from behind and fall just back of and parallel to the back tendons of shank (hind cannon).

The region from hip joint to hock should appear quite long and heavily muscled, clean, firm, and hard, giving rise to the great propelling power which should lie in this region.

The back should be broad, deep, and well supported, but clean, as in the knee of fore limb.

The shank also should appear much as the cannon, namely, broad from before back, firm, hard, and clean.

The hind pastern should have somewhat less slope than in the forelimb; angle about 60 degrees with ground; should be strong and yet free from coarseness.

The hind feet should appear much as the fore ones, but may be slightly smaller and more rounded.

The duties of the light horse are such as to demand that his gait (action), whether at walk or faster, be level and true, each stride evenly balanced.

Quality in a horse is indicated by a clean outline of the bones of the head and of the cannon regions, by a coat of fine glossy hair, a prominence of superficial veins, especially when exercised, and the entire absence of any coarseness anywhere.

If a horse is going to attract attention and command the highest market price, he must possess, in addition to the above features, an abundance of style, "showiness," when standing, and particularly when in motion.

CARE AND MANAGEMENT OF LIVE STOCK.

By judicious care and management of our live stock we can keep our animals most economically, keep them in a condition to render their most efficient service and avoid many of the preventable diseases and deformities.

Through a knowledge of some of the laws of hygiene and sanitation we should attempt to prevent disease rather than invite trouble in order to resort to treatment. When disease does occur it should not be the policy to "give him something," but rather, if in doubt as to what is best, give nature a chance; for damage as well as good may be done by the use of drugs.

From the birth of an animal on, close observation should be given; for personal attention is the first requisite to successful handling of live stock.

Below will be found a few of the general principles of care and management of live stock:

The quarters, whether barn or other shelter, should be sufficiently large to amply accommodate all animals kept. Horses and cattle should be allowed at least 20 to 40 square feet of floor space and not less than 1,000 cubic feet of air space, and preferably more. If a barn, it should be provided with windows (not a pigeonhole in front of each horse) of sufficient size and numbers, suitably placed so as to admit of abundance of fresh air and sunlight. These two items are of the utmost importance in the maintenance of health and in the recovery from disease as well. Damp, dark, and poorly ventilated stables are often a serious menace to health. Far too many of our quarters for animals are lacking in these essentials, and some of us are negligent in not taking full advantage of them even in our own houses.

"Let a little sunshine in"; sleep in a well-ventilated bedroom. Sunshine is the cheapest and one of the best disinfectants we have. Quarters should protect from cold, but not at the expense of good ventilation. In the quarters, however, the animal should not be required to stand in the sun's rays on a hot summer day nor in a direct draft in cold weather.

A satisfactory stall floor can be made by putting down a good layer of coarse gravel or cinders and covering with 2 inches of clay well packed down. Floors can be of tight boards or of cement; for stall, should be provided with a portable covering made of slats to allow urine to drip through, and kept well bedded.

After suitable quarters are provided, they should be kept clean, dry, and free from offensive odors. Chickens should not be allowed to roost in or near the stable, for chicken lice are frequently parasitic upon horses and cattle. While it may not be necessary nor even advisable to remove the manure daily, nor frequently if produced in small quantities, the stall should be kept sufficiently bedded to take up the excess of moisture. The sprinkling over every day or so with a little ground phosphate rock will assist in this as well as to balance up the composition of the manure as a complete fertilizer. Manure allowed to accumulate in this manner will serve as an excellent breeding place for flies during warm weather. In a week or ten days after laying the egg, the complete transformation into the adult fly will be accomplished. If flies are to be controlled the manure will have to be removed and scattered at least once a week in warm weather, or, if in small quantities, can be placed in fly-tight receptacles (solid or screened) and kept until in sufficient quantities to warrant hauling out.

The barn should be suitably located so as to afford good drainage from it and likewise the lot adjoining.

Bank barns, as a rule, are too difficult to admit of light and to ventilate, hence are not to be generally advocated. Shelter from rain and sunshine and a wind-break should be provided for all classes of animals, even if a closed barn is not necessary.

Work animals when warm from exercise should not be allowed to cool off too rapidly in cold weather, for fear of precipitating a case of pneumonia, pleurisy, or some other disease. Under such circumstances they should be stabled (out of a draft) blanketed, rubbed dry or slowly exercised until cooled out.

Heat stroke should be avoided by not overworking, driving or exciting animals, on hot, humid days; by watering frequently, with short breathing spells, and by providing some form of head shade.

In addition to keeping the barn in a sanitary condition, the animals also should be kept clean. The work animal should receive his daily grooming with currycomb, used with care, and brush or cloth. The currycomb should

be used to free the hair from dried sweat and dirt, but the skin should be cleaned with brush or cloth. A practice becoming quite popular in cities and towns, which should also extend to the country, is the early spring clipping of horses with thick, heavy coats of hair, shedding them slowly or not at all. In such cases, when horses work on warm days they are difficult to clean, the animals suffer not only from heat during the day, but from chilling at night. The slowly drying of the wet coat of hair on their bodies predisposes them to several diseases.

The feet should be looked after frequently by cleaning out the dirt from the sole, making the foot less liable to thrush, and at times detecting a foreign body which might later penetrate the foot. The hoof should be kept properly shaped to prevent undue strain on back tendons from too long a toe and on the pastern region by too high heels. Feet should be kept properly shod to prevent cracking of the hoof or wearing down and becoming tender-footed which may result in laminitis (founder).

Some hoofs have a tendency to become dry and brittle, particularly when kept on a board floor, which keep more moist and supple upon a ground floor. A good hoof oil or ointment assists very materially in keeping the hoof in good condition.

While animals in many cases are not kept in a thrifty, vigorous condition, others, particularly those used for breeding, are not infrequently kept in an overfat condition without sufficient exercise. This is often the sole cause for sterility and for weak offspring. The only animals that should be kept closely confined are those which are being rapidly pushed in the fattening pen. All breeding animals should get plenty of exercise. A misconception is often prevalent, thinking that the stallion and pregnant mare should be animals of leisure. On the contrary, they should be required to do a reasonable amount of work of much the same character as the other animals are doing. During the breeding season the stallion's exercise will have to be limited, perhaps, to driving to a light vehicle or in making short hauls.

The pregnant mare should do the regular farm work, except backing up of heavy loads, up to within two or three weeks of foaling, when she should be allowed freedom in a paddock and provided with a roomy box stall. The stall should be light and airy like the barn, well disinfected, such as with a 5 per cent coal-tar disinfectant, and well bedded.

Great care should be taken in the selection of good, sound, digestible feed, especially for the horse. Its composition, quantity given, and the regularity of giving should be considered.

The ration should be balanced, at least to some degree, according to the purpose it is to serve, namely, containing abundance of protein for growing hard working and heavy milking animals; a proportionately less protein for idle and fattening animals. The quantity to feed will depend largely upon the character of the ration, amount of work done, individual characteristics of the animal fed, etc. As a basis for horses and cattle, they may be started on 1 pound each of grain and of hay per day for each 100 pounds weight of animal. The close observer will soon be able to determine whether this is too little or too much and to make a change accordingly. Young animals should be given enough to keep them in a growing, thrifty condition; working animals to maintain their body weight, and fattening animals to gain in weight. Young animals kept thrifty are not so liable to be grossly infested with parasites when exposed to them. With rare exceptions, animals should only receive what they will eat up clean with a relish, and that which is not eaten in due time should be removed. With work animals, those growing or fattening rapidly, feeding should be done three times a day, but with idle animals twice a day may suffice equally as well.

Hard worked animals should receive the greater portion of their hay at the evening meal, with a small portion in the morning and none at noon. With those suffering from chronic indigestion it is often well to also reduce the noon grain ration some and add it to the night's meal.

Sudden changes in quality (kind) or quantity should not be made. Serious trouble not infrequently follows sudden changes made, especially from dry to green or new feeds. The change can be safely made by starting with a little

of the green or new feed mixed with old or dry and gradually increasing the new and decreasing the old. Idle animals should be given the run of a pasture, if available, and if not, at least a shaded, sheltered lot. Hard working animals should be given pasture or green feeds very sparingly, if at all.

They should not be given an extra, nor perhaps a full feed immediately before being put to severe labor, nor should they have any feed on immediately coming from work when excessively hot and tired. In the hot summertime a little hay before the grain feed is often a wise practice.

Water should be provided in abundance to all animals, preferably from a deep well, spring, or rapidly flowing stream. Ponds and sluggish streams should be guarded against; such water is more likely to contain disease-producing germs and not infrequently parasites.

Watering of work animals should be done before the noon and evening meals and after the morning one. In hot weather they should also be allowed water at least once between meals, and it is not a bad practice to allow a chance at the trough after dinner, just before going to work. If animals are watered sufficiently often they will seldom if ever drink to hurt themselves; on the other hand, if restricted from water for some time when they are hot, serious results, even a fatal one, may follow, if allowed to drink what they will.

CONTAGIOUS DISEASES OF LIVE STOCK.

By W. G. CHRISMAN, STATE VETERINARIAN, STATE DEPARTMENT OF AGRICULTURE.

Some of the most common and frequently met with diseases are cholera in hogs, contagious abortion in cows, and shipping fever in horses. By no means are these the simplest or mildest diseases just because we find them occurring so frequently; in fact, they are quite serious and difficult to treat. In the case of hog cholera, there is no treatment of any material value after the disease has once developed. The treatment in this case is preventive. Almost all druggists and veterinarians of all ages have tried to discover or compound some drug or combination of drugs that would prove a sure cure for hog cholera, but all have been disappointed. Recently the United States Department of Agriculture discovered a serum or vaccine which will prevent hog cholera. So popular has this serum become that many foreign countries have adopted this method and are now making and using the serum by the thousand doses.

Several of the individual States have adopted the United States method and are likewise making the serum in large quantities. The Department of Agriculture of this State, under the direction of the State Veterinarian, is making the serum and supplying the hog breeders and farmers as they request it.

The appropriation for this purpose is small; therefore the Department is obliged to charge the farmer the actual cost of manufacture, which is $2\frac{1}{2}$ cents per cc, 20 cc being the dose for a hog weighing from 100 to 150 pounds, thus making the cost of immunizing a hog 50 cents. Any farmer or hog breeder can obtain the serum by applying to the Department of Agriculture, Raleigh, N. C. To save yourselves inconvenience and delay when making an order for serum, please state the number of hogs you wish to inject, also the average weight (otherwise we do not know any more about the quantity of serum necessary than if you had not written at all). Then it becomes necessary for us to write you for the number and weights and wait for you to reply before this order can be filled. This may be too late. This serum work is conducted on a cash basis, so if you care to accompany your order by a check, it will not be considered an insult.

The time for you to think about ordering serum and injecting your hogs is when the disease appears in your neighborhood in close proximity to your own herd.

The symptoms of hog cholera: Pigs apparently well at morning may be dead at night; a redness of the skin; redness of the eyes; eyes likely closed with a gluey discharge; a cough may be present; diarrhea, and loss of appetite.

TREATMENT.

Separate the *well* hogs from the sick and inject them with serum to prevent their contracting the disease. Thoroughly disinfect pens, feed troughs, etc. Bury or burn all dead hogs to prevent dogs, buzzards, etc., from carrying the disease germs to other localities.

I say separate the well hogs from the sick ones and inject them to prevent their taking the disease, and I mean it. Not separate the *sick* from the *well*. The pens, lots, feed troughs, etc., are already infected, so to leave the well hogs there is running an unnecessary risk. It is no use to inject a sick hog with serum, for the serum is only a protective and not a curative agent. To inject the sick hog is a waste of time, energy, and money.

To determine whether a hog is sick or not the thermometer is the only safe guide. If the temperature is found to be two degrees above normal 102 F, the hog is already infected and will show the disease in a very short time so anybody can detect it. The disease, we would say, is in a stage of incubation—that is, the germ has been planted but has not developed or grown sufficiently to cause the hog any discomfort or uneasiness and to show any external symptoms.

CONTAGIOUS ABORTION IN COWS.

This disease becomes quite serious at times and causes heavy losses. Not that the cows die, but do often lose their usefulness as breeders.

The symptoms of the disease are the constancy of the cows in the herd to abort. Not only the same cows abort time after time, but also other cows in the herd will abort. Therefore, its name, "contagious abortion." The cows will, of course, carry their calves different lengths of time—some only a few weeks, while others for several months. The disease germ is frequently carried from one cow to another by the bull. Therefore it is wise to discontinue the use of a bull that has been serving cows which are known to abort.

The treatment is to thoroughly wash the cow's uterus, vagina and vulva with an antiseptic solution such as carbolic acid, creoline, or bichloride of mercury. Separate the affected cow from the herd and thoroughly disinfect the stable by a liberal use of lime, carbolic acid, bichloride of mercury.

This is a very difficult disease to eradicate, so do not become discouraged upon the first attempt.

SHIPPING FEVER IN HORSES.

This is a disease which has grown in extent very largely in the past few years; not only in extent and frequency, but also in severity.

We have no disease known to horses that is more contagious than shipping fever, or influenza, as it is often called; yet many dealers will tell you it amounts to nothing and speak of shipping fever as a mere trifle.

While only a small percentage of horses affected with shipping fever die, about 98 per cent are laid off of work from two to four weeks, lose their flesh and, in many cases, are left with some blemish or defect which materially reduces their usefulness and value.

The horse suffering from shipping fever will show a staring coat, tucked-up appearance in the flank, eyes very red; partially, if not entirely closed; swollen; a discharge of tears which may later become thick and yellow; head usually hangs low; ears cold; legs cold, often swollen; appetite poor; breathing quickened and somewhat labored; horse very unsteady in his gait from weakness; urine scant; bowel discharges hard, usually containing mucus; throat swollen and sore; horse evinces great pain upon swallowing food or water; high temperature.

TREATMENT.

Place the horse in a *clean*, comfortable box stall. Give him plenty of pure fresh air and a fresh bucket of water three times daily or oftener. Blanket him according to weather and his condition. Bathe legs well in hot water, dry thoroughly, and bandage to stimulate the circulation, and make him comfortable. Curry and rub him well twice daily. He enjoys a rubbing and it does him as much good as it does you to have your face washed and hair combed when you are sick. Tempt his appetite with the best food the market

affords. A few apples, turnips, carrots, a little green grass, and such like. In short, give him good nursing and make him as comfortable as circumstances will allow; and, in fact, if circumstances or surroundings do not permit of his being comfortable, change "circumstances."

Be sure that no feed bucket, water bucket, halter, bridle, blanket, etc., used for the sick horse are used for any well one until thoroughly disinfected; for if you do, that one will most likely contract the disease and you will have the pleasure of nursing two instead of one.

The drugs used in these cases are aromatic spirits of ammonia, alcohol, nux vomica, as stimulants. Ammonia and alcohol, one to two ounces in a pint of sweet milk or water; nux vomica, one drachm in teacupful of water. The ammonia and alcohol can be given every three or four hours. Nux vomica once or twice daily. Nitrate of potash or sulphate of potash, one ounce daily in three doses. Quinine, one-half drachm three times daily. One quart of raw linseed oil at the outset of the disease.

With this treatment the majority of the cases will recover nicely.

BEEF CATTLE.

All cattle are divided into or fall into certain classes according to the work they do to best advantage. In other words, the disposition they make of the feed they consume over and above the amount needed for maintenance determines this class.

When we take into consideration that cattle are only machines for converting hay, fodder, and grains into some product for human food, and they are the only machines or factories known that will convert those materials into beef, milk, butter, and cheese, we get a much clearer conception of the real meaning of beef cattle, milk cattle, or butter cattle.

By beef cattle we mean those types of cattle which will use their surplus feed to best advantage in the manufacture of beef. Of this type we have three prominent breeds: Shorthorn, Hereford, and Aberdeen Angus. While these are the three leading beef breeds, there are others, such as Red Poll and Devon. By some writers the Red Poll and Devon are classed as dual purpose; but for the present we will consider them beef breeds.

Of the three breeds mentioned first, we can scarcely say one is better than the other, for they belong on the same plain. It is a matter of choice or preference with each man himself which he likes best, and then that becomes the best for him. Every one of us will give our best attention and efforts to the things we like best. Therefore, the breed of cattle we like best will give us best results and becomes best for us.

The two remaining breeds are good and in some sections are very popular, but for strictly beef purposes are rather small and have a tendency toward the dairy conformation.

When we go into the business of producing beef we want the breed of cattle that will produce that product at the least cost and in the greatest quantities. Then it behooves us to select one of the best breeds. I say *one* of the best breeds, and I mean *one*. Do not make the mistake that so many have done and think that you can produce better steers by breeding together two breeds than pure-bred steers of either one. Just remember whenever you breed together two distinct breeds you are producing grades of both breeds and going down hill. Again, when you breed together two distinct breeds you are much more apt to confine the poor qualities of both breeds in the offspring. As an example, and one that is commonly practiced, if you breed a Holstein cow, which produces a large quantity of milk but poor in butter fat, to a Jersey bull, a breed which produces a small quantity of milk and rich in butter fat, you are very likely and most apt to produce a heifer that will produce a small amount of milk, the character inherited from the sire, and that little poor in butter fat, the character inherited from the dam. The reverse is your desire, but you may be disappointed. Knowing these things, and also being able to buy the pure-breds of any breed we may fancy, let us act wisely in the matter and purchase our foundation stock of pure breeding. Surely, if we wanted a plow we would not go to the store or factory and buy

a Syracuse beam, an Oliver chill mold-board, a South Bend landside, and Mount Joy point, and go home on the back porch, take a clawhammer and a monkey-wrench to make a plow of these parts. Well, it is just as absurd to think we can make the different breeds of cattle fit together and do the desired work well.

I take it we do not expect to raise beef cattle, or any others for that matter, except for the profit they give us in consuming the products of our own farm, converting them into beef and establishing a new channel through which to market these products.

Then, if this is our desire, do as we would in purchasing a piece of machinery for any other purpose—buy the machine that was manufactured for that particular purpose, and buy the best. The best is the one that will do most satisfactorily the greatest amount of work and at the least cost.

I am a great believer in beef cattle when we can make them consume our farm crops at market price and save the trouble of hauling these away. Unless we can figure market prices for our crops fed at home, then the feeding or raising of cattle becomes a burden and not a profitable business. Yes, they should do more than this. They should make us a profit above all cost of feed, labor, and incidentals which always enter into any business proposition or venture.

PREPARING ORCHARD CROPS FOR MARKET.

BY S. B. SHAW, ASSISTANT HORTICULTURIST.

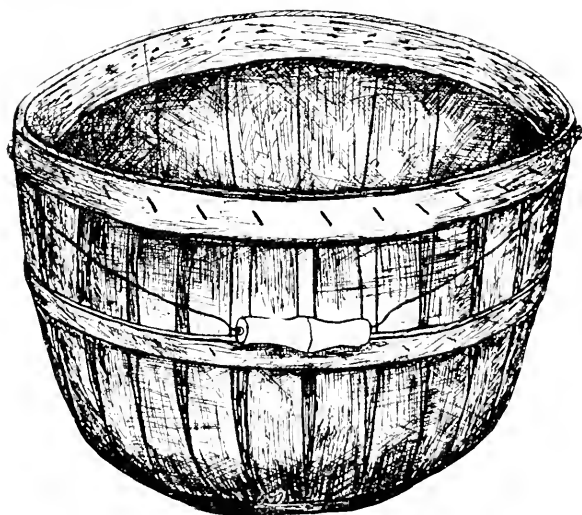
The ultimate object of every fruit grower should be to place on the market fruit that will attract and please the consumer. An observation of the markets in any of our cities will show that there is room for great improvement in the preparation of fruit for market. Purchasers have certain likes and dislikes that must be considered if fruit is to be disposed of profitably. The time was when apples were just apples, and peaches, peaches, regardless of the appearance and quality of the fruit; but nowadays the general public is becoming more and more enlightened as to the superior qualities of certain varieties. People have learned to discriminate against orchard products placed on the market in an unattractive condition both as regards the fruit itself and the package in which it is contained.

With a soil and climate adapted to the production of superior fruit, there is no reason why eastern and southern States should not produce fruits of as good quality and attractive appearance as those of any of the northwestern sections. They will do so when growers realize more keenly than they do now that the old careless, haphazard methods of orcharding are becoming obsolete; that they cannot shape their present or future course by methods that prevailed a decade ago, and that have become archaic under the development of modern business. It is generally believed that if the same care had been practiced in growing, grading, and packing eastern and southern fruit that is exercised in some of the western fruit districts, the western grown fruit would not have made the inroads on eastern fruit that it has. There is no comparison between the fruit belt of the east and that of the west so far as markets, freight rates, etc., are concerned, and surely eastern and southern fruit has the preference as to flavor.

Each of the various products of the orchard has, to a certain extent, its own particular characteristics, necessitating a different method of handling for different markets. There are, however, several important rules that apply to the handling of every kind of fruit, regardless of the market. Cleanliness, neatness, and uniformity are three qualities required in the preparation of all fruits for securing and holding a select trade that will be profitable. In order to develop these qualities it is necessary to give careful attention to several points frequently overlooked by growers. One of the most important of these is the method of growing the crop.

The preparation of fruits for market really begins with their production. A suitable location should be secured, the land properly prepared, varieties carefully selected, good healthy trees planted, and a careful system of cultivation followed. A great deal depends upon this cultivation, for it includes not only the tillage of the soil, but the training of the young trees and their protection from the attacks of numerous insect and fungous enemies.

Twenty years ago there was little need to fight orchard pests, as the injury caused by them was scarcely appreciable. At the present time, particularly in the older sections of the country, it has become necessary to combat these pests in order to grow marketable crops. This marked change, coming in so short a time, and in many instances causing serious loss, has naturally been discouraging, and as a result many growers have been slow in adapting themselves to these new conditions. Although the combating of insect and fungous enemies has without doubt slightly increased the cost of production, those growers who have persistently used proper methods for their control have been uniformly successful in growing profitable crops of high-grade fruit. An examination of any market will show that the well developed, firmly colored, clean and attractive products of the orchard bring the highest prices. Care and attention on the part of the grower and the demands of the consumer are responsible for this condition. Careless, indifferent cultivation and the unchecked ravages of different insects and fungi are principally the cause of undersized, poorly colored, diseased and unattractive specimens of orchard crops. Fruit of this kind is usually a glut in the market, for buyers do not want it at any price.



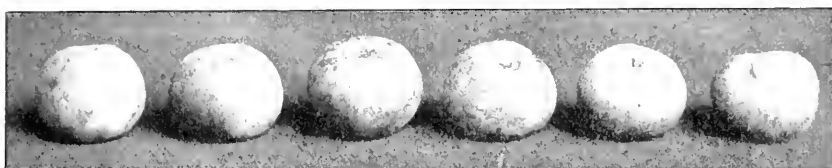
FRUIT PICKING BASKET.

Another point often given too little consideration by growers is the method of harvesting the fruit. The state of maturity at which fruit can best be picked depends upon the varieties and the purposes for which they are intended. Summer varieties, for home use or for the local market, need not be gathered until fully ripe. Fall and winter fruit intended for the same use may be allowed to fully ripen, but should be picked before the mellowing process begins. Summer, fall, and winter varieties, for long-distance shipment or for storage, should be gathered as soon as fully grown and colored.

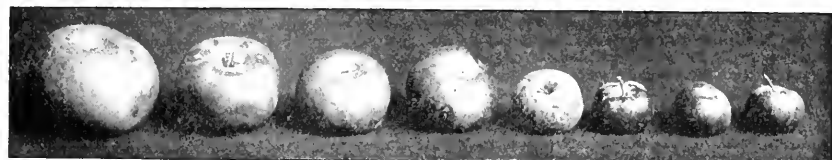
In gathering fruit, either for market, storage, or home purposes, it is necessary to remove the fruit from the trees with a great amount of care. This work should always be done by hand, and not in the careless, wholesale way of shaking or knocking the fruit off as is the common practice in certain

localities. This latter method invariably results in bruising and snagging the fruit, thereby damaging its keeping qualities and destroying its general attractiveness. Fruit growers seldom realize how much the normal keeping season of fruit is shortened by bruises due to careless, indifferent handling. When the flesh of a fruit is bruised the cells are crushed, the juices are liberated, fermentation develops, and decay results. The life of an apple, peach, or pear depends very much on the care used in picking it. When fruit is shaken from the tree, thrown into a hard-bottomed or rough-sided basket, dumped into a wagon box or carelessly poured into a barrel, the keeping season is materially shortened.

As the fruit is picked from the tree, it should be carefully placed in either a basket or sack, arranged to suit the convenience of the picker. These receptacles usually hold from a peck to half a bushel, depending upon the kind of fruit gathered. The handle basket shown in Fig. 1 is used in many localities for this purpose. The inside is often padded to lessen the liability of bruising. A piece of iron rod bent in the shape of the letter S makes a good hook with which to suspend the basket from either a limb or the rung of a ladder while picking. The fruit is picked either from the ground or from stepladders, or other light ladder that can be carefully laid against the limbs or branches of the trees. Ladders should not be thrown upon or against the limbs, as this damages both the fruit and the trees.



PROPERLY GRADED FRUIT.

Photo by S. B. Shaw

POORLY GRADED FRUIT.

Photo by S. B. Shaw

Probably the most important operation in preparing fruit for market is the grading. This work can best be started in the orchard with the growing of the crop. Careful cultivation means fewer culls and less expense for sorting and grading. Uniformity is the chief requirement to be considered in this operation. One of the greatest defects in the system of marketing on the part of a great many growers is the lack of proper grading and packing. Too often soundness is the only thing considered and no attention whatever is paid to the difference in varieties, size, degree of ripeness, color and general appearance of the fruit. Growers should attempt to handle and market their crops so that they will be uniform in quality, condition, and general appearance. Fruit of all kinds should be sorted so that in each package each specimen is as nearly like the others as is practicable. The efficient grader has in mind the appearance of the whole package, and not the individual specimens. This work can seldom be overdone, for the more rigid the grading the greater the profits at the time of sale. Fig. 2 shows two lots of apples as taken from two different consignments. The barrel from which the well-graded fruit was taken sold a little in advance of the market price on account of the pack being uniform throughout. The other barrel, containing apples of all sizes and degrees of color and condition, sold at a price considerably lower than the market on account of the grower's disregard for uniformity.

Packing is equally as important as any of the other operations involved in the preparation of fruits for market. "Every grower's pack should be as good as his bond." Customers want honestly packed goods, and they are usually willing to pay good prices for them. A grower never loses by placing honestly packed fruit on any market, be it at home or abroad.

Each package should be filled with the same grade throughout. If this is done the top may be "faced." This is an honest and perfectly legitimate practice provided the entire contents are fruits of the same grade as those placed on top. "Seconds" and inferior grades should never be "faced" with "prime" specimens. "There is neither cash nor character in this practice." A few "seconds" or "culls" scattered in with a lot of fancy or prime specimens gives the buyer an opportunity to discriminate against the whole package and ruins the reputation of the grower as an honest packer.

Packages should be well filled, with the contents placed firmly and snugly. Every day consignments are placed on the market showing evidences of careless packing. Consider for a moment the average route traveled by a barrel of apples, or, it may be, a crate of peaches. The package is taken from the packing shed or orchard and loaded into a wagon. It is then hauled, say, from 1 to 6 miles over the average country road to the railroad station, where it is transferred to a car. After traveling from 20 to 200 miles, and possibly more, it is again unloaded and placed in a wagon and this time hauled for several squares over the usual city street, until it finally reaches its destination and is ready to be opened for the inspection of the general public and the criticism of the possible buyer. Unless this package has been well filled and packed before starting, it will reach the market in what is commonly called a "slack" condition. The numerous handlings and jarrings received en route will have caused the contents to settle and shrink and as a result the package will be only partially full. Buyers cannot be expected to pay the price of full packages for those only filled in part. Not only is the sale of fruit affected in this way, but loose packing invariably causes bruises and the general defacement of each specimen. Too tight packing should also be guarded against, as this frequently results in bruising. There is a "happy medium" in packing that can be learned only by experience.

In some localities growers have found it profitable to wrap certain kinds of their fruit before packing. Suitable paper of a light grade is used for this purpose, and if the stock is "fancy," each wrapper has printed on it an attractive label bearing the name of the brand, where and by whom grown. The cost of these wrappers is very slight, and they not only serve as a means of advertising fancy produce, but they improve the appearance of the whole package. Further than this, the use of wrappers has a tendency to prolong the keeping qualities of the fruit. One or more peaches or apples in a package may begin to rot. This condition causes a liberation of moisture that, unless checked, will spread and cause decay to develop in other specimens. When each fruit is wrapped the paper absorbs a certain amount of this moisture, thus checking for a time the spread of decay. Wrappers are also an aid in keeping fruit firm and snug in the packages.

When fruit is packed, ready for shipment, see that each package has the cover securely fastened in place. Complaints are frequently made regarding the condition in which fruit reaches the market, owing to the careless and insecure way in which covers have been fastened. No matter how carefully the packing has been done, fruits will not reach their destination in good condition unless properly covered. One often sees fruit of excellent quality reach the market in a badly damaged condition on account of an insufficient number of nails or fasteners used at the time of shipment.

The fruit package of to-day is an influential factor in the produce business. Many growers do not consider the relation the package bears to the selling value of their products. It has been only within recent years that the individual consumer could carry fruits home in the packages in which they originally reached market. The small package is gaining favor every day. Its development has been brought about by brisk competition resulting from the ever increasing demands of the public.

At present there are no packages universally recognized as legally standard, yet the one characteristic most notable of the American package is its uniformity. Although many poorly constructed, "short," inferior packages are still found on the markets, it will be but a question of time before this type will become so thoroughly unpopular that the unscrupulous grower and packer who desires to use them will be compelled to recognize the demands of the trade regarding uniformity or go out of business. While uniformity is a marked characteristic of the American package, a great many growers fail to grasp the importance of this point. They ship fruits in packages that may answer the requirements of their local markets, but that do not comply with the demands of distant markets. As a result, dissatisfaction arises between the grower and the buyer. The buyer discriminates against this fruit, the grower becomes discouraged, and the business that might have become very profitable is given up in disgust, all on account of the disregard, on the part of the grower, of market requirements. Growers should become familiar with the conditions and preferences of the markets on which they expect to place their fruits. The business of marketing fruit has become so well developed that there is no reason why one should not be thoroughly acquainted with the present requirements and conditions of any market. Buyers, commission merchants, and produce dealers in general are always willing to furnish growers with any information regarding the preparation of fruits for sale, and the most desirable packages to use in placing these fruits on the different markets. If growers would visit the markets to which they send their products they would become better acquainted with existing conditions, and would be enabled to prepare and pack their fruit to the better satisfaction of both the buyer and themselves.

The practice of labeling or branding fruit packages is a point worthy of some consideration. Many growers do not appreciate the importance of this feature, particularly with reference to the sale of their fruit each successive year. They seem to hesitate about the small additional expense incurred, and do not consider that the money spent in this way will result in a quicker and more profitable sale of their fruit during coming seasons. It has been only within recent years that growers have made any attempt at marking their fruit packages before placing them on the market. In practically every other branch of industry producers have marked their goods with some label, brand or trade-mark, to distinguish them from the productions of others. The sale of these products is greatly influenced by this distinction.

The man who puts up an honest pack of first-class fruit in uniform, well-constructed packages need never fear that the money spent for attractive labels will be wasted. Such a brand will often insure against loss during gluts, and cause prompt sales at advanced prices when the conditions affecting demand and supply are normal. For instance, a grower, after carefully grading and packing his fruit, puts his label on each package; they go to market, are exposed for sale, a buyer purchases them and upon examining the contents finds he has received full value for his money. He immediately looks to see where the fruit came from and by whom packed. The next time he has to purchase this same kind of fruit, whether the same season or the next, he looks for this brand. Thus the label has accomplished two purposes: it has been a guarantee and has served as a means of advertising.

THE HOME VEGETABLE GARDEN.

BY O. M. CLARK.

The pleasure and profit to be derived from a good vegetable garden is a privilege enjoyed to its fullest extent only by those leading a rural life; but, strange to say, the average farmer painfully fails to appreciate this rare privilege. In fact, in many cases he neglects this opportunity to such a pitiful extent that we are prone to think that he, more than any other person who pretends to have a garden at all, needs to be urged to have, and informed how

to make and maintain, a good vegetable garden. The farmer used to large areas of general farm crops feels that he is stooping from his dignity or is wasting his time when he undertakes anything so small as he imagines the vegetable garden to be; consequently, he plows it, perhaps, and leaves the planting and tilling to the "women folk." As a matter of fact, there is not on the farm a piece of land of the same area, the profit of which approaches anywhere near to that of the vegetable garden. Farmers' Bulletin 255, United States Department of Agriculture, says upon this subject: "From careful observation, the statement can safely be made that a well-kept garden will yield a return ten to fifteen times greater than would the same area if devoted to general farm crops." Besides, the fact that there can be had at a minute's notice a bountiful supply of fresh, clean vegetables is a value that cannot be reckoned in dollars and cents.

The great question of keeping the boy and girl on the farm would be more than half solved if people would only realize the important part the vegetable garden plays in this regard. It is hardly likely that too much attention can be given the vegetable garden; for the rapid growth of southern cities and towns and the growing popularity of the southern summer and winter resorts are constantly increasing the demand for good garden vegetables of all kinds; hence, if the gardener has a surplus, he or she can find a ready market for it.

The essential things to be considered in discussing the home vegetable garden are: location; planning; preparation and cultivation; fertilization; equipments.

In locating the garden, the question of its proximity to the house is of vast importance; for naturally most of the work is done during spare moments that could not be taken advantage of if the garden were located a half-mile from the house. Too often it is the case that all the gathering and most of the work are done by the housewife. Even where the work is done by the man, the woman, having to do the gathering, goes back and forth between the house and the garden many times during the year; and many times she has to carry with her a child or two. All these things tend to add to the work of the already overburdened housewife, which condition could be materially improved by exercising a little care and forethought.

Other things being equal, the general lay of the land determines to a considerable extent the earliness of the garden crops. Well-drained land sloping gently to the south or southeast is preferable for the production of early crops. Wind-barriers, such as hills, woods, hedges, buildings, etc., on the north and northwest, produce very much the same effect. If none of these are so located that they can be taken advantage of, a tight board fence will answer the purpose, and at the same time act as a safeguard against farm animals and poultry. Choose a location that is well drained or bring it to this condition after it has been chosen. None of the vegetables will tolerate "wet feet." In many cases it will pay a hundred per cent to tile drain the garden.

It is a serious mistake, which, however, is often practiced, to wait till planting time to begin to plan the garden. The rainy days in winter could be advantageously utilized for this purpose. A diagram showing the location of the various prospective crops is indispensable for a well-arranged garden. A plan of this kind will save much trouble and vexation in the future. It is impossible to obtain the most pleasure and profit for the time, labor, and money expended unless the garden has been carefully and judiciously planned.

If circumstances will permit, make the rows long, thereby saving time in turning and economizing land—and incidentally sparing temper and the horse's hide. Grow vegetables in rows long enough and wide enough to permit cultivation by horse and wheel-hoe. If the rows are very long, it may be necessary to plant more than one kind of vegetable in the same row, in which case it is exceedingly important that the plants are compatible—that is, require the same general treatment and practically the same growing season. For example, salsify and parsnips would be an ideal combination, while parsnips and lettuce would be a very faulty pair. The perennials, such as asparagus, rhubarb, etc., should be planted at one side where they will not interfere with the plowing and tilling of the other crops. The larger growing plants, as

corn, late cabbage, and potatoes, may be planted together on the other side of the garden. Of course, these suggestions are general, since frequently there are conditions over which we have very little or no control. Sometimes there is a decided variation in the character of the soil in the same garden; and this, as well as any other local condition, ought to be taken in consideration in arranging for the location of the various crops. For example, if a part of the garden be low, moist, and cool, this place should not be planted to early crops which require a quick, warm soil; but it should be reserved for such crops as onions and celery.

In order to obtain the greatest remuneration for the time and expenditure given the garden, and at the same time maintain the productiveness of the land, a rotation of crops, manures, and tillage must be practiced in the garden as well as on the general farm. It is doubly important to rotate if diseases and insects become serious on any one crop; and in a rotation to eradicate diseases and insects the greatest care should be taken to select those crops on which these particular pests cannot thrive. For example, the potato "scab" will live on such plants as turnips, radish, and rutabagas. Hence, in planting these vegetables the infected area must be carefully avoided. There are some pests, however, which cannot be starved out in this manner in so small a place as the garden. In a case of this kind it is usually cheaper to plant that particular crop and others on which this pest would exist in a different part of the farm until the pest has been starved out of the garden.

Time and labor will be saved by making the garden soil deep, fine, and rich before planting. It is not sufficient that the land be smooth on top, but the pulverizing process should extend as deep as the plowing; for but few things are more detrimental to the delicate roots of the small plants than clods and air spaces, both of which are results of poor preparation. Of course, we realize that it is more easy to *say* pulverize deeply than it is to do it; for there are really no implements on the market that will pulverize the land as deeply as it ought to be plowed. But this can be largely overcome by doing part of the pulverizing before plowing, by means of a disc or cutaway harrow. Then by free use of the harrow after plowing the pulverizing process can be completed in excellent shape. It would be more pleasant and economical to prepare half the garden well than to poorly prepare the whole. In fact, preparation is really one of the secrets of success in gardening. Vegetables, as a whole, are more particular in regard to their food and moisture than are the general field crops. They will not tolerate being stunted from lack of food and moisture. It behooves us, therefore, to prepare by deep preparation a capacious reservoir to hold the water and by frequent shallow cultivation keep it there, in order that the plants may have a constant and regular supply. Frequent cultivation also keeps down weeds and helps to render the "locked up" plant food available. Weeds not only rob the plants of food and moisture, but they and vegetables are incompatible associates. Furthermore, stirring the soil permits the entrance of air for the use of the roots and for the oxidation of the organic matter, thereby preserving in the soil a proper growing condition. An ill-planned and poorly tilled garden is an eye-sore and anything but an advertisement to a farm and home.

The kind of fertilizer employed influences to a marked degree the character and quality of the vegetables produced. Barnyard manure is undoubtedly the best for this purpose, but care should be taken to see that it is well rotted and contains no elements that would be injurious to the soil. An excess of such things as sawdust, shavings, etc., which do not rot quickly, used as bedding, have a tendency to produce sourness in the soil, which condition is detrimental to practically all garden vegetables. Even when barnyard manure is used it is usually economical to use supplementary a good, high-grade commercial fertilizer. Of course, no definite rule can be given for the kind or quality of fertilizer to be applied, as this varies with the crop, land, and other conditions. Usually, however, vegetables as a whole require a fertilizer with a greater per cent of potash than is required by the general field crops. Under ordinary conditions a fertilizer with an analysis of 3 per cent nitrogen, 8 per cent phosphoric acid, and 10 per cent potash would be found to give excellent results on a vegetable garden. Nitrate of soda hastens the growth of such early crops

as asparagus, rhubarb, lettuce, etc., as it supplies nitrogen in a quickly available form. Hardwood ash is one of the best sources of potash, provided it has not been exposed to rain. It has the additional advantage of being free from weed seed and spores of fungi, which fact cannot always be said of barnyard manure. Lime, while not directly a fertilizer, often produces beneficial results when applied to garden soil; for if the soil is at all sour all vegetables, with the possible exception of corn and potatoes, will be greatly benefited by an application.

Although the gardener in the South, being particularly blessed with a long growing season, has vegetables for several months during the year, yet by the use of a little expense, labor, and judicious planning he could have a larger assortment and more continuous supply of vegetables for a longer time than at present. By use of the hotbed and cold frames, without which no garden is complete, the vegetable season could be lengthened at both ends. The hotbed consists of an inclosure covered with sash (in some cases cloth is substituted for glass) and supplied with some form of artificial heat to keep the soil warm and in condition to favor plant growth; usually fermenting stable manure is used for this purpose. The cold frame is a hotbed without the artificial heat. In preparing the hotbed have the manure thoroughly mixed and fined so that it will heat uniformly. After the bed has been prepared, let the heat come down to 80 degrees F. before planting the seed. After the plants are up the hotbed should be ventilated during the morning of warm days by raising the sash on the opposite side from the wind, and watered on bright days during the morning only. There are certain plants, such as beans, melons, etc., which, in order to have extra early, have to be planted in pots, as they transplant with difficulty. While there are pots which can be bought cheaply for this purpose, a sufficient number of plants for home use can be started by using old tomato cans or any kind of old tin cans or berry baskets. Throw the old cans in the fire; the tops and bottoms will melt off and the joints in the sides will melt apart. Tie a string or wire around the can; after filling with rich garden soil, plant the seeds, and put the cans in the hotbed, where they should be treated just as any other plants. When the seedlings are large enough to transplant, the cans may be lifted, the strings or wires cut, and the plants with the dirt adhering to the roots may be transplanted to the open with safety. Or the cans may be put in the ground in transplanting and then drawn about halfway out, leaving them around the plants for a while as a protection against cutworms. By this method of transplanting almost any of the vegetables can be safely transplanted after they have attained a considerable size.

While there are any number of little things that may be observed with profit in gardening, yet if the few suggestions here mentioned are given a consideration the pleasure and profit from the average home vegetable garden will be materially increased.

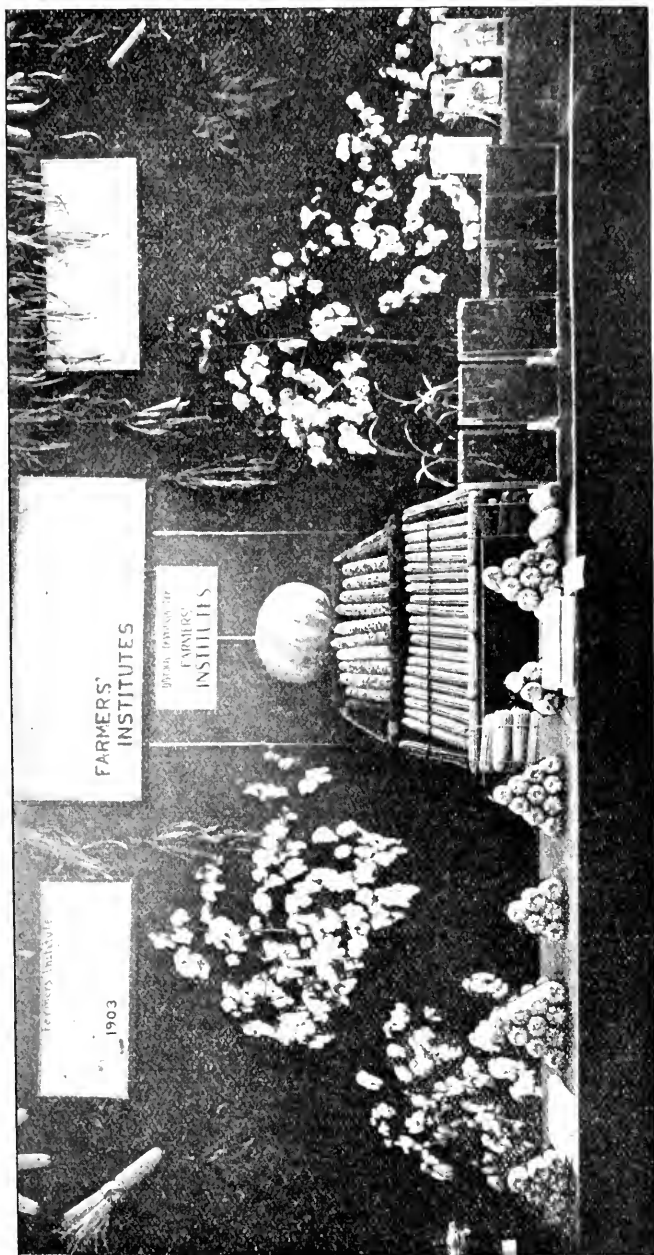
ECONOMIC ENTOMOLOGY AND THE FARMER.

BY FRANKLIN SHERMAN, JR., ENTOMOLOGIST.

In this article we wish to show what bearing the study of insects has upon the welfare of the farmer and to point out a few ways in which the farmer may benefit by the work that is being done in this line.

Entomology is the study of insects; and *economic entomology* has to do with insects which are destructive and how to control them, or with insects which are beneficial and how to increase them.

The average person thinks of an insect as being merely a "bug," to be shuddered at, stepped upon, and forgotten as quickly as possible. If the insect is destructive, we call it a "pesky little critter" or some other name, and let it go at that. We have no names which are really definite for most insects; we simply say, "It was a little black bug," or "a big yellow fly"; but we have no definite names in common use for each insect. Most of us give no thought



FARMERS' INSTITUTE EXHIBIT, STATE FAIR, 1911.

whatever to the *life* of an insect—how long it lives, where it lays its eggs, how long it takes to get grown, what changes of form it undergoes, etc. We merely ignore all these details.

And yet there are many more *different kinds* of insects than there are of all other animals combined. And in their effect upon human welfare insects are far more important than any other group of animals, with the exception of those which we use for food or as beasts of burden.

Occasionally some insect makes its appearance in great numbers on our crop, and *then* we begin to see the great power for harm that there is in these tiny creatures. Some insect pests have been of such severity or attracted such attention as to figure quite prominently in what we might call agricultural history. The Chinch Bug has at times done enormous destruction to grain crops, while the Hessian Fly has in certain years caused a loss in wheat running into millions of dollars. The Potato Beetle caused genuine and deep-seated concern when it spread eastward from the Rocky Mountains and for a time threatened to stop the growing of the Irish potato. The San José Scale caused much uneasiness among fruit growers, and many State legislatures passed laws looking towards its control. The Brown-tail and Gipsy Moth have caused enormous losses in New England, and other eastern States are taking official steps to guard against the introduction of these pests in their limits. The Cotton Boll-weevil has laid a heavy tax on the cotton growers in Texas, Louisiana, and adjoining States, and bids fair to spread over the entire cotton area. In the forests there have been some notable outbreaks, a good example (though a moderate one) being the damage to short-leaf pine by the Southern Pine Bark-beetle during the present year (1911) in the Southern States.

Each individual year witnesses severe injury by insects, and each year certain species are more abundant than usual. Thus one year many kinds of plant lice may be destructive, while the next year they may not attract attention, but Chinch Bug may be excessively abundant. And so it goes: a season that is unfavorable to one insect pest may just suit another.

Years and years ago, when there were no agricultural colleges, no experiment stations, and no State or National Departments of Agriculture, each farmer had to learn to master his own problems. If an insect was destructive, he must find a remedy himself or do without. There was no one to whom he could appeal for information or help. But when we advanced far enough to establish these great institutions for the purpose of aiding agriculture, the farmers began to look to them when special difficulties arose.

And for a long time entomology was not recognized as important enough to justify the employment of specially trained or skilled men. But as time went on, and one new pest after another made its presence felt, and the call for definite, effective help became more insistent, men were employed to give the whole of their time and talents to the study of insects and remedies for those that are destructive.

To-day there is scarcely a State that does not have one or more men employed at public expense to conduct studies on the insect pests, and to aid the farmers in protecting crops from their ravages. Most of the States also have laws which are designed to keep new pests from being carried in on shipments of trees or plants; the National Department of Agriculture at Washington has a force of several hundred men engaged in this work, and all over the country, in every State, there is a definite system of work going on to find out new facts in regard to insect pests, and to teach the farmers how to use what has already been found out.

The exact life-history of practically every important insect pest is known to more or less degree, although important details or important habits are being discovered every year which makes our methods of control more certain or more simple.

It is not to be supposed that *easy* and *inexpensive* methods are known for controlling all sorts of insect pests. It is true that some are very easily controlled if one is but prepared to apply the remedy, as, for example, the Potato Beetle, which is easily controlled by the use of Paris green; others require careful and painstaking hand-labor, like the Borers in fruit trees; and there

are still others against which we are well-nigh helpless, like the Ear-worm in corn. There is no "magical remedy" for insects. All the remedies require some expenditure of time or money or labor (or all three) in order to be successful.

In many cases we know of no economical way to combat the insect when it once attacks the crop, but are to some extent able to prevent the attack in the first place. An example of this is the common "Budworm" in corn, which we may dodge by planting the corn either very early or quite late, but which we have no remedy for when it once begins its attack in the cornfield. There are some pests that could be prevented if we knew it would be worth while, but usually it is not. An example of this is the Boll-worm of cotton, which could be prevented by dusting the plants with poison early in August; but usually it is not destructive enough to justify this, so we do not do it, with the consequence that it sometimes does serious injury, which, once the injury begins, is not easily checked.

In order to select a remedy which shall be properly effective, we need to know the entire life and habits of an insect. By such studies we find out the weak points in the insect and direct our remedies accordingly. If it greedily devours the leaves of our crop we may usually poison it; if it sucks the sap we must use some solution of soap, oil, or other substance which kills by *contact*. If it hides in some especial place in winter we may kill it at that season. If it begins its attack on the plant only at a certain point we may protect that particular part and thus save the plant. If the insect crawls instead of flies, we may check it by artificial barriers. An excellent example of this is the summer brood of Chinch Bug, which has wings and spreads from small grain stubble into the corn; yet they almost always *crawl* (even though they have wings), and may often be checked merely by a deep furrow. All these considerations show that we must continually *study* our insect pests; we should know their origin, native country and native food, where they spend the winter, how widely distributed through the country, how actively they move about, how they take their food and from what part of the plant, how long the insect lives in each different stage of its existence, how many eggs are laid and where, and in what stage of existence is the winter passed, etc., etc. There are "a thousand and one" little facts which we need to know about an insect pest before we can be assured that the remedy which we recommend is the best.

Many of our worst pests have been imported from other countries. Not only is this true of insects, but the English Sparrow and the House Mouse are excellent examples among the higher animals. Under the conditions of modern commerce the spread of insect pests is very liable to occur. As a result such insects as House Flies, Grain Weevils, and Cockroaches have been spread all over the earth by ships, trains, etc. In the same way, the shipment of living plants or cuttings from such plants may carry insect pests with them. Examples of this kind are numerous, the San José Scale, Codling Moth, and Hessian Fly being among the most notable. Even at this time the New England States and the United States Government are spending millions of dollars to control the Gipsy and Brown-tail Moths, both of which were imported from Europe, and the entomologists of all the other States are now constantly on guard against the introduction of these two important pests, and positive records *show absolutely* that their efforts *have prevented* these from gaining headway in many new localities.

A satisfactory remedy cannot always be found instantly. We have had doctors since the dawn of history, yet there are diseases for which we have only very imperfect remedies or preventives. What wonder that there should be insects for which we have no good remedy when the "insect doctors" are so few, their science so new, and so much of the field unexplored? Long and patient investigation into the minutest details of an insect's life sometimes yields only imperfect remedies, yet by gaining such a thorough understanding of the insect we are able to adapt even imperfect remedies so as to get a reasonable return. A fine example of this is found in the Cotton Boll-weevil, which is now spreading over the cotton area from the southward. Probably no insect pest has ever been more thoroughly and completely studied in every detail of its life, habits, preferences, etc., but we have no entirely satisfactory

single remedy. Yet by putting together all the facts we know about its life and habits we are able to partly dodge, partly outwit, and partly kill the weevil, so that after all a profitable cotton crop is *possible*; and yet it is utterly impossible if we do not take advantage of what has been found out in these studies.

The Division of Entomology of the North Carolina State Department of Agriculture is doing what it reasonably can to assist the farmers of the State in the control of insects. We answer hundreds upon hundreds of letters every year upon this subject; we issue circular-letters, circulars, and bulletins about insects from time to time as occasion may demand. We are accumulating a collection of the insects of the State in order to know what insects we have and the parts of the State where each is found; we inspect the nurseries of the State to prevent the sending out of infested trees, and we inspect orchards in all parts of the State to show what insects are at work and how to control them; we give actual field lessons or "demonstrations" in the spraying of fruit trees to protect them from insects; we inspect shipments of plants coming into the State from foreign countries to prevent new serious pests; we discuss the subject of insects at Farmers' Institutes and other meetings all over the State, and we make some new studies of the lives or remedies for insect pests every year.

All this requires time, patience, energy, and careful labor, yet we regard it as a pleasant line of duty when we see the many evidences of its usefulness and appreciation. A few years ago one could almost count on the fingers of one hand the fruit growers who sprayed; now they number hundreds. A few years ago we dreaded the "Fly" in our wheat, but now nearly all farmers plant a little later, so that serious injury is unusual. A few years ago the Potato Beetle destroyed our potatoes at will, but now we use poison and raise potatoes in spite of it. A few years ago the gray Cabbage Louse would kill our cabbages, but now we easily control it with a solution of soap in water. A few years ago we regarded the House-Fly as an irritating nuisance which we only attempted to fight with a slap (and perhaps an oath thrown in), but now we know the importance of the fly in spreading disease, and people everywhere, and doctors especially, are waging an intelligent warfare against it.

The study of insects is no small subject, however small the insects may be themselves. Our crops suffer from them, our shade trees suffer from them, our forests suffer from them, our live stock suffers from them, and even man himself not only suffers annoyance, but contracts deadly disease as a result of their presence. We may well be thankful that our awakening intelligence shows us that these pests are not inevitably and unalterably present as a curse from Providence, but that they are capable of being controlled by intelligent effort when we once know all the essential facts about them. But we must get all the facts; we must keep digging for the yet unknown "truths that shall make us free."

TOBACCO CULTURE.

By E. G. Moss.

In considering the tobacco crop there are two dominant factors, viz., quality and quantity, and it is an indisputable fact that if you increase one or the other out of the proper proportion it is done to the detriment of the other factor, and *vice versa*. Consequently, however expert a man may be in growing and handling a crop of tobacco, he cannot lay down one set rule by which each farmer may be guided. When you grow corn, if you can double your yield per acre you profit by the operation; if you double your yield of cotton per acre you profit. Generally speaking, when you increase your cotton or corn per acre in quantity your quality remains constant or increases; but it is different with tobacco. You may double your number of pounds per acre, and if it is done by indiscriminate methods, such as unbalanced fertilizers and

fertilizers from the wrong sources, your quality will decrease in the same ratio, or perhaps faster, than your pounds increase, and instead of the farmer being benefited, he is damaged. It is not a difficult thing to grow 1,000 to 1,200 pounds of tobacco per acre in the old belt in North Carolina, and I believe it is entirely possible to grow 1,500 to 2,000 pounds per acre, if you go in for pounds and sacrifice quality (speaking of quality in this article, I refer to color and texture); but under existing conditions, will such methods be profitable? Knowing as little as we do about tobacco—when I say this I do not mean to say that we know less than tobacco growers in other States, but what I do mean is that we are just beginning to learn and there is a vast amount yet to be learned about handling tobacco, both in growing and curing.

The one important thing I should like to impress upon all tobacco growers is that the ratio between quality and quantity is variable. When this is thoroughly appreciated, then we can make a start towards improving both. The failure to grasp this one fact and appreciate the relative importance of it has no doubt caused many a tobacco grower to get his balance on the wrong side of the ledger.

There are a few fundamentals that must rank first in importance in order for us to increase our yield and still maintain our quality.

The first is improved seed. All farmers should have an ideal plant from which they hope to propagate their plantings. He cannot be sure that he is doing this unless he saves the seed from this plant without any cross-pollination from other plants which may be very inferior. It is a well-known fact unless the seed heads from this plant are protected they may become mixed by bees, humming-birds, or butterflies carrying the pollen from one blossom to another on their feet or bills. This pollen may be carried some distance; consequently, when you have an "open pollinated" seed head, you do not know what you are planting the next year. But by a "close pollinated" seed head you know that you are planting seed from your ideal plant, and you can reasonably expect, under similar environment and seasonal conditions, for like to beget like, and from year to year there will be a perceptible increase in uniformity and general improvement of your tobacco. This, however, cannot be done in one year's time; no more can you develop a prolific corn from a one-eared variety, in one year; but by continuous selection of the two- and three-eared stalks for seed more and more stalks will have two and three ears, until within a few years you have a prolific variety.

When you have saved your tobacco seed under bag, then it is very important that the light seed should be removed before sowing seedbed. This can be easily done by building a fire in a close room, cracking the door, through which will be a draft, and then pour the seed slowly from a bottle to a pan placed on the floor, holding bottle some two or three feet above pan in front of crack in the door. The heavy seed will fall in pan, the light seed be blown away. There are several methods in use, but I merely suggest this as a very simple one.

Deep and thorough preparation of the land is as important for tobacco as corn or cotton. To illustrate this I think will probably show the tobacco grower the folly of poor and shallow preparation. It is generally conceded among the farmers in the bright flue-cured belt that they make a good crop of tobacco about once in five years; the other four years the crop is from medium to poor; and when tobacco ranges from medium to poor—the farmer is growing it at a loss. Consequently we decide the fifth year is an ideal season, or approximately so, for a seedbed broken 3 inches deep, which is about the average depth plowed in this bright tobacco belt. Now, if you will break this land 6 inches deep, which you can do in fall or winter without turning the clay on top, and not damage in the least the quality of your tobacco, then instead of having your tobacco drown on 3 inches of soil or fire up on 3 inches of soil, you will have 6 inches, which will take care of twice as much rainfall, also hold twice as much moisture and in all probability reduce the percentage of poor crops 50 per cent. I think every farmer can appreciate at once the importance of it. After your land is thoroughly broken it is important that the land should be thoroughly fine. The hair-like roots of a tobacco plant cannot grow off rapidly in clods; so it is desirable to harrow as often as possible before planting.

In order to get the maximum returns there are two more fundamentals which must be considered; first, plenty of the right kind of humus; second, liberal application of fertilizers.

It is well known that the finest crops of tobacco are always grown on virgin soil. There must be some other cause for this than mere plant food, since you can add all the plant food you want to a sand hill, and you will get no crop; but by the addition of plenty of humus, then you are almost assured of a crop. Consequently, I believe our greatest amount of progress in growing tobacco within the next few years will be by the addition of plenty of humus. There are several ways in which this can be done. One very largely practiced, I'm sorry to say, is to let land rest a few years, grow up in weeds, broomsedge, etc., and unfortunately some tenant will come along and set fire to this, destroying what nature has done to recuperate the wornout soil. However, if matches nor fire were available in such a field, no doubt an excellent crop of tobacco could be grown on such a field if it were plowed under long enough for it to rot thoroughly before planting time. Peas and clovers can be used successfully, provided they are turned under and another crop come between them and tobacco. Rye and oats may be used successfully to precede the tobacco crop, provided they are turned under at least three or four weeks before planting, otherwise they decay slowly and may cause the tobacco to grow off slowly. Particularly is this true of rye when it is allowed to stand too long. So the ideal condition for tobacco is a deep soil, well filled with humus, approaching as nearly as possible the same condition that exists in virgin soil.

Now we come to the fertilizer question, one about which every farmer should concern himself, as there are from twelve to fifteen million dollars spent yearly in North Carolina for commercial fertilizers.

Of the three elements—phosphorus, nitrogen, and potash—tobacco requires more potash. In order to grow 1,000 pounds of tobacco it requires from 70 to 90 pounds potash, 60 to 75 pounds nitrogen, and 50 to 60 pounds phosphorus. At the same time a very large percentage of tobacco growers use 8-2-2 and 8-3-3 fertilizer, irrespective of the requirements of the crop. And so far as the farmer knows, the nitrogen in this ready-mixed fertilizer may be obtained from some slowly nitrifying source, which may be the cause of a considerable loss to the farmer, and he never be able to locate the trouble. The potash may be and most likely is in the form of the muriate, while it is generally recognized that the sulphate is the most desirable form for tobacco.

In a series of experiments conducted in this State and several of the other tobacco States, dried blood has been found to give excellent results as the source of nitrogen. It may be and frequently is desirable to get a part of your nitrogen, say from one-third to one-half, from nitrate of soda, the phosphorus from acid phosphate, and potash from sulphate of potash.

The following mixture has been found to give very good results:

575 pounds dried blood.
1,125 pounds 16% acid phosphate.
300 pounds sulphate potash.
<hr/>
2,000 pounds.

Use from 800 to 1,000 pounds per acre. Nearer the piedmont section it might be entirely safe to reduce the potash and increase both the other ingredients slightly. In quite a number of experiments this has given better results, both as to weight and quality, side by side with the 8-3-3 fertilizers.

To sum up, I should like to urge upon every tobacco grower in North Carolina not to increase his acreage in tobacco, but break and prepare his land well, fertilize liberally, and he can certainly make more tobacco on considerably less acreage than has been done.

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LEAF TOBACCO SALES FOR NOVEMBER, 1911.

Pounds sold for producers, first hand.....	23,944,030
Pounds sold for dealers.....	680,434
Pounds resold for warehouses.....	1,294,514
	<hr/>
Total.....	25,918,978

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